

The Burden of Chronic Diseases in Missouri: Progress and Challenges



Missouri Department of Health and Senior Services
June 2013

Report Information

Title: The Burden of Chronic Diseases in Missouri: Progress and Challenges.

Description: This report describes the burden, trends, and disparities of chronic diseases in Missouri, identifies progress in reducing the burden and disparities in the last decade and suggests challenges ahead in chronic diseases prevention and control.

Audience: This report is intended for use by the general public as well as state and local policy makers, researchers, local public health agencies, health care personnel, voluntary organizations and others interested in the prevention and management of chronic diseases and associated risk factors in Missouri.

Permission to copy, disseminate, or otherwise use information from this report is granted as long as appropriate acknowledgment is given.

Grant support

This report was supported in part by a cooperative agreement between the Centers for Disease Control and Prevention (CDC) and the Missouri Department of Health and Senior Services (#3U58DP001976-04W1). Its contents are solely the responsibility of the authors and do not necessarily represent official views of the Centers for Disease Control and Prevention.

Acknowledgement:

The authors would like to thank Bert Malone, Belinda Heimericks, and Cherri Baysinger for comments and suggestions.

Suggested Citation:

Yun S, Kayani N, Homan S, Li J, Pashi A, McBride D, Wilson J. The Burden of Chronic Diseases in Missouri: Progress and Challenges. Jefferson City, MO: Missouri Department of Health and Senior Services. June 2013

Contact Information:

Shumei Yun, MD, PhD
State Chronic Disease Epidemiologist
Team Leader, Chronic Disease and Nutrition Epidemiology Team
Section of Epidemiology for Public Health Practices
Division of Community and Public Health
Missouri Department of Health and Senior Services
Ph: 573-522-2809 or Email: Shumei.yun@health.mo.gov
PO Box 570, Jefferson City, MO 65102

RELAY MISSOURI for Hearing and Speech Impaired 1-800-735-2966 VOICE 1-800-735-2466
AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER
Services provided on a nondiscriminatory basis.

Table of Contents

	Page
<i>Introduction</i>	1
<i>Executive Summary</i>	2
Part One: Chronic Diseases other than Cancer	13
<i>Chapter I: Death</i>	14
Leading Cause of Death	15
Leading Cause of Premature Death	16
Heart Disease	17
Chronic Lower Respiratory Disease	18
Cerebrovascular Disease (Stroke)	19
Diabetes	20
<i>Chapter II: Hospitalization</i>	21
Heart Disease	22
Cerebrovascular Disease (Stroke)	23
Chronic Obstructive Pulmonary Disease	24
Asthma	25
Diabetes	26
Arthritis (Osteoarthritis)	27
<i>Chapter III: Emergency Room Visit</i>	28
Heart Disease	29
Stroke	30
Asthma	31
COPD	32
<i>Chapter IV: Prevalence of Chronic Conditions and Diseases</i>	33
Obesity	34
High Blood Pressure	35
High Blood Cholesterol	36
Diabetes	37
Heart Attack Survivors	38
Stroke Survivors	39
Arthritis	40
Current Asthma	41
Multiple Chronic Diseases	42

Part Two: Cancer Incidence, Mortality, Screening, and Survivorship	44
<i>Chapter V: Cancer</i>	45
All-Cancer Incidence Rate	46
Prevalence of Cancer Survivor	47
All-Cancer Mortality Rate	48
Lung Cancer Incidence Rate	49
Lung Cancer Mortality Rate	50
Breast Cancer Incidence Rate	51
Breast Cancer Mortality Rate	52
Prevalence of Breast Cancer Screening	53
Prostate Cancer Incidence Rate	54
Prostate Cancer Mortality Rate	55
Colorectal Cancer Incidence Rate	56
Colorectal Cancer Mortality Rate	57
Prevalence of Colorectal Cancer Screening	58
Cervical Cancer Incidence Rate	59
Cervical Cancer Mortality Rate	60
Prevalence of Cervical Cancer Screening	61
Part Three: Risk Factors for Chronic Diseases and Complications	62
<i>Chapter VI: Risk Behaviors</i>	63
Tobacco Use among Adults	64
Tobacco Use among Youth	65
Unhealthy Diet among Adults	67
Unhealthy Diet among Youth	68
Physical Inactivity among Adults	69
Physical Inactivity among Youth	71
Heavy Drinking among Adults	72
Multiple Risk Behaviors	73
Part Four: Management of Chronic Diseases and Risk Factors	74
<i>Chapter VII: Chronic Diseases Self-management Practices</i>	75
Diabetes Self-management Education	76
Self-monitoring Blood Glucose among Adults with Diabetes	77
Arthritis Self-management Education	78
Risk Behaviors among Adults with Chronic Disease	79

<i>Chapter VIII: Chronic Diseases Management and Care</i>	80
Hemoglobin A1C Monitoring among Adults with Diabetes	81
Foot Exam among Adults with Diabetes	82
Eye Exam among Adults with Diabetes	83
Flu Shot among Adults with Diabetes	84
Pneumococcal Vaccination among Adults with Diabetes	85
Part Five: Socio-Economic Status and Chronic Diseases and Risk Factors	86
<i>Chapter IX: Social Determinants of Health</i>	87
Income and Poverty	88
Education	91
Race and Ethnicity	94
Urbanization	97
Sexual Orientation	100
Part Six: Progress and Challenges	102
<i>Chapter X: Progress in the Last Decade</i>	103
Decreased Burden	104
Mortality Rates	104
Hospitalization and Emergency Room Visit Rates	105
Cancer Incidence Rates	105
Prevalence of Chronic Diseases and Conditions	105
Prevalence of Risk Factors	106
Improvement on Cancer Screening and Chronic Diseases	106
Care and Self-management	
Reduced Disparities	107
<i>Chapter XI: Challenges</i>	108
Aging Population	109
High and Increasing Burden	109
Racial/ethnic and Socioeconomic Disparities	110
Funding	110
<i>References and Sources</i>	111
<i>Glossary</i>	113

List of Figures

Page

Part One: Chronic Diseases Other than Cancer

Chapter I: Death

1a.	Leading Causes of Death in Missouri, 2010	15
1b.	Leading Causes of Premature Death in Missouri, 2010	16
2.	Heart Disease Mortality Rates* Missouri and US, 2000-2009	17
3.	Heart Disease Mortality Rates*, by Race and Sex, Missouri, 2000-2009	17
4.	Chronic Lower Respiratory Disease Mortality Rates* Missouri and US, 2000-2009	18
5.	Chronic Lower Respiratory Disease Mortality Rates*, By Race and Sex, Missouri, 2000-2009	18
6.	Cerebrovascular Disease Mortality Rates* 2000-2009, Missouri and US	19
7.	Cerebrovascular Disease Mortality Rates*, by Race and Sex, Missouri, 2000-2009	19
8.	Diabetes Mortality Rates* 2000-2009, Missouri and US	20
9.	Diabetes Mortality Rates*, by Race and Sex, Missouri, 2000-2009	20

Chapter II: Hospitalization

10.	Heart Disease Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009	22
11.	Cerebrovascular Disease Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009	23
12.	Chronic Obstructive Pulmonary Disease Hospitalization Rates*, by Race and Sex, Missouri 2000-2009	24
13.	Asthma Hospitalization Rates* by Race and Sex, Missouri, 2000-2009	25
14.	Diabetes Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009	26
15.	Osteoarthritis Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009	27

*Age-adjusted using 2000 US standard population

Chapter III: Emergency Room Visit

16.	Heart Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009	29
17.	Cerebrovascular Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009	30
18.	Asthma Emergency Room visit Rate*, by Race and Sex, Missouri, 2000-2009	31
19.	Chronic Obstructive Pulmonary Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009	32

Chapter IV: Prevalence of Chronic Conditions and Diseases

20.	Prevalence of Obesity among Adults, Missouri and US, 2000-2010	34
21.	Prevalence of Obesity among Adults, by Race and Sex, Missouri, 2000-2010	34
22.	Prevalence of High Blood Pressure among Adults, Missouri and US, 2001-2009	35
23.	Prevalence of High Blood Pressure among Adults, by Race and Sex, Missouri, 2001-2009	35
24.	Prevalence of High Cholesterol among Adults, Missouri and US, 2001-2009	36
25.	Prevalence of High Cholesterol among Adults, by Race and Sex, Missouri, 2001-2009	36
26.	The Prevalence of Diabetes among Adults, Missouri and US	37
27.	Prevalence of Diabetes among Adults, by Race and Sex, Missouri	37
28.	Prevalence of Heart Attack Survivors among Adults, Missouri and US, 2001-2010	38
29.	Prevalence of Heart Attack Survivors among Adults, by Race and Sex, Missouri, 2001-2010	38
30.	Prevalence of Stroke Survivors among Adults, Missouri and US, 2001-2010	39
31.	Prevalence of Stroke Survivors among Adults, by Race and Sex, Missouri, 2001-2010	39
32.	Prevalence of Arthritis among Adults, Missouri and US, 2001-2009	40
33.	Prevalence of Arthritis among Adults, by Race and Sex, Missouri, 2001-2009	40

*Age-adjusted using 2000 US standard population

34.	Prevalence of Current Asthma among Adults, Missouri and US, 2001-2010	41
35.	Prevalence of Current Asthma among Adults, by Race and Sex, Missouri, 2001-2010	41
36.	Prevalence of Chronic Diseases among Adults, Missouri, 2011	42
37.	Prevalence of Multiple Chronic Diseases among Adults, Missouri, 2011	42

Part Two: Cancer Incidence, Mortality, Screening, and Survivorship

Chapter V: Cancer

38.	All-cancer incidence Rates*, by Sex Missouri and US, 2000-2008	46
39.	All-cancer incidence Rates*, by Race and Sex, Missouri, 2000-2008	46
40a.	All-cancer Prevalence by Race/Ethnicity in Missouri, 2011	47
40b.	Top 10 Most Prevalent Types of Cancer among Adults, Missouri, 2011	47
41.	All-cancer Mortality Rates*, By Sex, Missouri and US, 2000-2008	48
42.	All-cancer Mortality Rates*, by Race and Sex, Missouri, 2000-2009	48
43.	Lung Cancer Incidence Rates*, by Sex, Missouri and US, 2000-2008	49
44.	Lung Cancer Incidence Rates, by Race and Sex, Missouri, 2000-2008	49
45.	Lung Cancer Mortality Rates*, Missouri and US 2000-2008	50
46.	Lung Cancer Mortality Rates*, by Race and Sex, Missouri, 2000-2009	50
47.	Breast Cancer Incidence Rates* among Women, Missouri and US, 2000-2008	51
48.	Breast Cancer Incidence Rates* among Women, by Race, Missouri, 2000-2008	51
49.	Breast Cancer Mortality Rates* among Women, Missouri and US, 2000-2008	52
50.	Breast Cancer Mortality Rates*, by Race Missouri, 2000-2009	52
51.	Had Mammogram within the Past Two Years among Women Age 40+, Missouri and US, 2000-2008	53
52.	Had Mammogram within the Past Two Years among Women Age 40+, by Race, Missouri, 2000-2008	53
53.	Prostate Cancer Incidence Rates*, Missouri and US, 2000-2008	54
54.	Prostate Cancer Incidence Rates*, by Race, Missouri, 2000-2008	54

*Age-adjusted using 2000 US standard population

55.	Prostate Cancer Mortality Rates*, Missouri and US, 2000-2008	55
56.	Prostate Cancer Mortality Rates*, by Race, Missouri, 2000-2009	55
57.	Colorectal Cancer Incidence Rates*, by Sex, Missouri and US, 2000-2008	56
58.	Colorectal Cancer Incidence Rates*, by Race and Sex, Missouri, 2000-2008	56
59.	Colorectal Cancer Mortality Rates*, Missouri and US, 2000-2008	57
60.	Colorectal Cancer Mortality Rates*, by Race and Sex, Missouri, 2000-2009	57
61.	Ever had a Sigmoidoscopy and Colonoscopy among Adults, Age 50+, Missouri and US, 2001-2010	58
62.	Ever had a Sigmoidoscopy and Colonoscopy among Adults Age 50+, by Race and Sex, Missouri, 2000-2010	58
63.	Cervical Cancer Incidence Rates*, Missouri and US, 2000-2008	59
64.	Cervical Cancer Incidence Rates*, by Race, Missouri, 2000-2008	59
65.	Cervical Cancer Mortality Rates*, Missouri and US, 2000-2008	60
66.	Cervical Cancer Mortality Rates*, by Race, Missouri, 2000-2009	60
67.	Had a Pap-test within the Past 3 Years among Women Age 18+, Missouri and US	61
68.	Had a Pap-test within the Past 3 Years among Women Age 18+, by Race, Missouri	61

Part Three: Risk Factors for Chronic Diseases and Complications

Chapter VI: Risk Behaviors

69.	Current Smoking among Adults, Missouri and US, 2000-2010	64
70.	Current Smoking among Adults, by Race and Sex, Missouri, 2000-2010	64
71.	Current Smoking among High School Students, Missouri and US, 2001-2009	65
72.	Prevalence of Current Smoking among High School Students, by Race, Missouri, 2001-2009	65
73.	Current Smoking among Middle School Students, by Race, Missouri, 2003-2011	66
74.	Fruit and Vegetable Intake Less than 5 Times Per Day among Adults, Missouri and US, 2000-2009	67
75.	Fruit and Vegetable Intake Less than 5 Times Per Day among Adults, by Race and Sex, Missouri, 2001-2009	67

*Age-adjusted using 2000 US standard population

76.	Drank Soft Drinks 2 or more Times Per Day During the Past 7 Days among High School Students, by Race and Sex, Missouri, 2009	68
77.	No Leisure-time Physical Activity among Adults, Missouri and US, 2000-2010	69
78.	No Leisure-time Physical Activity among Adults, Missouri and US, 2000-2010	69
79.	Not Meeting CDC Physical Activity Recommendations among Adults, US and Missouri, 2001-2009	70
80.	Not Meeting CDC Physical Activity Recommendations among Adults, By Race and Sex, Missouri, 2001-2009	70
81.	Did Not Attend Physical Education Classes in an Average Week among High School Students, Missouri and US, 2001-2009	71
82.	Did Not Attend Physical Education Classes in as Average Week among High School Students, Missouri, 2001-2009	71
83.	Heavy Drinking among Adults, Missouri and US, 2001-2010	72
84.	Heavy Drinking among Adults, by Race and Sex, Missouri, 2001-2010	72
85.	Prevalence of Multiple Risk Factors among Adults, by Race and Sex, Missouri, 2001-2010	73

Part Four: Management of Chronic Diseases and Risk Factors

Chapter VII: Chronic Disease Care Self-management

86.	Ever Attended a Diabetes Self-management Class among Adults with Diabetes, Missouri and US	76
87.	Ever Attended a Diabetes Self-management Class among Adults with Diabetes, by Race and Sex, Missouri	76
88.	Daily Self-monitoring of Blood Glucose among Adults with Diabetes, Missouri and US	77
89.	Daily Self-monitoring of Blood Glucose among Adults with Diabetes, by Race and Sex, Missouri	77
90.	Ever Taken a Course to Learn How to Manage Arthritis or Joint Symptoms among Adults with Arthritis, Missouri and US	78
91.	Ever Taken a Course to Learn How to Manage Arthritis or Joint Symptoms among Adults with Arthritis, by Race and Sex, Missouri	78

92.	Current Smoking among Adults with Chronic Diseases/Conditions, Missouri, 2008-2010	79
93.	Physical Inactivity among Adults with Chronic Diseases/Conditions, Missouri, 2008-2010	79

Chapter VIII: Chronic Disease Management and Care

94.	Had 2 or more A1C Tests in the Last Year among Adults with Diabetes, Missouri and US	81
95.	Had 2 or more A1C Tests in the Last Year among Adults with Diabetes, by Race and Sex, Missouri	81
96.	Had a Foot Exam in the Last year among Adults with Diabetes, Missouri and US	82
97.	Had a Foot Exam in the Last year among Adults with Diabetes, by Race and Sex, Missouri	82
98.	Had a Dilated Eye Exam in the Last Year among Adults with Diabetes, Missouri and US	83
99.	Had a Dilated Eye Exam in the Last Year among Adults with Diabetes, by Race and Sex, Missouri	83
100.	Had a Flu Shot in the Last Year among Adults with Diabetes, Missouri and US	84
101.	Had a Flu Shot in the Last among Adults with Diabetes, by Race and Sex, Missouri	84
102.	Ever had a Pneumococcal Vaccination among Adults with Diabetes, Missouri and US	85
103.	Ever had a Pneumococcal Vaccination among Adults with Diabetes, by Race and Sex, Missouri	85

Part Five: Socio-Economic Status and Chronic Diseases and Risk Factors

Chapter IX: Social Determinants of Health

104.	Chronic Disease Health Indicators for Adults by Household Income, Missouri, 2011	89
105.	Percent of Population in Poverty by County, Missouri, 2010	90
106.	Chronic Disease Health Indicators for Adults by Education Level, Missouri, 2011	92

107.	Percent of Adults age 25 and older with less than a High School Education, Missouri, 2006-2010	93
108.	Chronic Disease Health Indicators for Adults by Race/Ethnicity, Missouri, 2011	95
109.	Percent of Racial and Ethnic Minority Population by County, Missouri, 2010	96
110.	Chronic Disease Health Indicators for Adults by Rural/Urban Status, Missouri, 2011	98
111.	Urban and Rural Areas by Zip Codes, Missouri, 2011	99
112.	Chronic Disease Health Indicators for Adults by LGBT Status, Missouri, 2011	101

Introduction

Chronic diseases are defined by the Centers for Disease Control and Prevention (CDC) as those diseases that are prolonged, do not resolve spontaneously, and for which a complete cure is rarely achieved.¹ According to the World Health Organization (WHO), chronic diseases such as cancer, heart disease and diabetes have reached global epidemic proportions and now cause more deaths than all other diseases combined.²

In the United States, almost 1 out of every 2 adults has at least one chronic illness, and more than 1 in 4 has multiple concurrent chronic conditions. Chronic diseases steal the vigor of life and compromise the quality of life. These diseases cause major limitations in daily living for almost 1 out of 10 Americans or about 25 million people. They account for almost 70 percent of all deaths in the U.S., which is about 1.7 million each year. Chronic diseases are costly. More than 75 percent of health care spending is on people with chronic conditions. Finally, however, most chronic diseases are preventable.

The objectives of this report are to describe the burden, trends, and disparities of chronic diseases in Missouri, identify progress in reducing the burden and disparities in the last decade and suggest challenges ahead in chronic disease prevention and management. The data presented in this report will be used by chronic disease programs to guide planning.

¹ Centers for Diseases Control and Prevention. Chronic Diseases. Available from: <http://www.cdc.gov/chronicdisease/resources/publications/aag/chronic.htm>

² United Nations. Sixty-sixth General Assembly Plenary. Available from: <http://www.un.org/News/Press/docs/2011/ga11138.doc.htm>

Executive Summary

Burden of Chronic Diseases in Missouri

Death and Premature Death with Chronic Diseases as Underlying Causes

In Missouri, chronic diseases are major causes of death. In 2010, a total of 55,054 Missourians died and about 71 percent of these deaths were due to chronic diseases. Heart disease was the number one killer, accounting for 25.0 percent of all deaths; followed by cancer, 22.8 percent; chronic lower respiratory disease, 6.4 percent; cerebrovascular disease (stroke), 5.4 percent; and diabetes, 2.6 percent. In total, these five causes accounted for 62.2 percent of all deaths in Missouri in 2010.

Chronic diseases are also major causes of premature death in Missouri. In 2010, a total of 14,827 Missourians died prematurely under the age of 65 and more than 59 percent of these deaths were due to chronic diseases. Cancer was the number one cause of premature deaths, accounting for more than 26.2 percent of the premature deaths; followed by heart disease, accounting for about 19.9 percent; chronic lower respiratory disease, 4.0 percent; diabetes, 2.8 percent; cerebrovascular disease, 2.4 percent.

The death rates for heart disease, cancer, stroke, and diabetes declined significantly in the last decade in Missouri overall, and among white men and women and African-American men and women; however, the death rates for these five chronic diseases were higher in Missouri than in the U.S. In Missouri, the death rates of these chronic diseases were higher among African-Americans than among whites, except for chronic lower respiratory diseases in which the rate among African-Americans was lower.

Prevalence of Chronic Diseases and Conditions

A high proportion of Missourians are affected by chronic diseases/conditions and many have multiple chronic diseases/conditions. Among Missouri adults in 2011:

- 30.2 percent were obese
- 34.3 percent had hypertension
- 39.7 percent had high cholesterol
- 10.7 percent had diabetes

- 29.4 percent had arthritis
- 10.2 percent had asthma
- 8.1 percent had chronic lower respiratory disease (COPD)
- 2.6 percent had kidney disease
- 18.5 percent had vision impairment
- 20.6 percent had depressive disorders
- 5.4 percent were heart attack survivors
- 3.8 percent were stroke survivors
- 9.4 percent were cancer survivors.

The percentages of adults with these chronic diseases/conditions were higher in Missouri than the US, except for the prevalence of vision impairment, which was similar to that in the US. In addition, about 3 in 4 Missouri adults (74.4%) had at least one of the above 13 chronic diseases/conditions, more than 1 in 2 (51.7%) had at least two, more than 1 in 3 (34.5%) had at least three, more than 1 in 5 (21.7%) had at least four, more than 1 in 8 (12.9%) had at least five, and about 1 in 14 (7.1%) had at least six of these diseases/conditions.

The percentage of people with chronic diseases/conditions was on the rise in Missouri in the last decade. The prevalence of obesity has increased on average at about one percentage point per year, hypertension 1.8 percentage points, diabetes 0.3 percentage points, and asthma 0.1 percentage points per year. African-Americans had a significantly higher prevalence of obesity, hypertension, diabetes, and asthma than whites, but significantly lower prevalence of high cholesterol.

Emergency Room Visit Data

When chronic diseases are not well managed and controlled, visits to emergency rooms and hospitalizations are more likely. In 2009, the age-adjusted emergency room visit rate for heart disease was 12.8 per 1,000 population, for COPD 5.6 per 1,000, and for asthma 5.1 per 1,000 in Missouri. During the past decade, the emergency room visit rates increased significantly for heart disease and COPD, and decreased significantly for asthma in Missouri. African-Americans had significantly higher emergency room visit rates for all three diseases than whites.

Hospitalization Data

In 2009, the age-adjusted hospitalization rate for heart disease was 136.8 per 10,000 population, for cancer 36.2 per 10,000, for osteoarthritis 29.3 per 10,000, for stroke 28.9 per 10,000, for COPD 23.9 per 10,000, for diabetes 17.4 per 10,000, and for asthma 13.5 per 10,000. These diseases led to more than \$6.0 billion in hospital charges, including more than \$3.6 billion in charges to Medicare and \$518 million in charges to Medicaid. From 2000 to 2009, the age-adjusted hospitalization rates for heart disease and stroke have declined significantly among white men and women, but not among African-American men and women. The age-adjusted hospitalization rates for asthma and diabetes have increased significantly among African-American men and women. The rate for osteoarthritis has increased significantly in Missouri for all four racial and gender groups. Obesity is a major risk factor for osteoarthritis and the obesity epidemic is a major contributing factor to this upward trend in osteoarthritis hospitalization. The hospitalization rates among African-Americans were significantly higher than among whites for heart disease, stroke, asthma, and diabetes, but lower than whites for osteoarthritis.

Prevalence of Risk Behaviors

Chronic diseases share common risk factors-- smoking, lack of physical activity, unhealthy diets and heavy drinking. Among Missouri adults in 2011:

- 23.0 percent were current smokers
- 23.7 percent were physically inactive
- 87.4 percent did not consume fruits and vegetables five or more times per day
- 7.3 percent drank alcohol heavily.

Overall, 88.0 percent of adults had at least one of the four risk factors, 41.8 percent had at least two, and 10.7 percent had at least three. Again, the percentages of adults with these risk behaviors were higher in Missouri than in the US, although the prevalence of tobacco use declined significantly in Missouri in the last decade. The prevalence of physical inactivity was higher among African-Americans than among whites.

Screening and Early Detection

Screening and early detection are important for detecting disease at an early and treatable stage. For cervical cancer and colorectal cancer, screening is also a preventive measure. In 2010, 71.3 percent

of women age 40 or older had a mammogram within the past two years in Missouri, compared to 75.2 percent in the US. About 80.1 percent of Missouri women age 18 or older had a Pap test within the past three years, compared to 81.3 percent in the US. The prevalence of ever having had a sigmoidoscopy or colonoscopy among adults age 50 or older was 65.2 percent in Missouri, the same as the US prevalence.

Chronic Diseases Self-management

When people develop a chronic disease, its self-management is very important for preventing complications and exacerbations, and improving the quality of life. In 2011, among Missouri adults with diabetes, 56.3 percent had ever taken a diabetes self-management class to manage their diabetes, similar to US prevalence of 52.2 percent; 64.4 percent conducted daily self-monitoring of their blood glucose, compared to 63.2 percent in the US. About 10.8 percent of Missouri adults with arthritis had ever taken a class to learn how to manage their arthritis, compared to 12.5 percent in the US.

Among people with chronic diseases, a healthy life-style is important for preventing complications. In 2011, among people with diabetes in Missouri, 19.0 percent were current smokers, 42.4 percent were physically inactive, and 77.3 percent were not consuming fruits and vegetables five or more times per day. Among adults with arthritis, 38.4 percent were physically inactive. The smoking prevalence among adults with asthma was 27.9 percent, among adults who ever had a stroke it was 24.0 percent and among adults who ever had a heart attack smoking prevalence was 26.1 percent.

Chronic Diseases Care and Management

High quality medical care and management are important for people with chronic diseases. In 2011, among Missouri adults with diabetes, 73.5 percent had two or more hemoglobin A1C tests, significantly higher than the US prevalence of 68.7 percent; 75.3 percent had their feet examined by a doctor in the last year, compared to 74.5 percent in the US; 68.8 percent had an annual dilated eye exam, slightly lower than the US prevalence of 70.3 percent; 61.2 percent had seasonal flu vaccination in the last year, significantly higher than the US prevalence of 53.5 percent; and 57.4 percent ever had a pneumococcal vaccination, similar to the 58.2 percent in the US.

Social Determinants of Health

The social determinants of health are the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics.³ The WHO Commission on Social Determinants of Health concluded in 2008 that the social conditions are the single most important determinant of one's health status.

Income and Education

There is a positive association between income and health. Individuals in poverty have the worst health indicators, including the prevalence of chronic diseases, conditions, risk behaviors, preventive care practices, health care coverage, and living environments (*Refer to chapter XI of the full report for data*). In 2011, 15.8 percent or 920,118 Missourians lived in a family with a household income below poverty level (e.g. \$22,811 per year for a family of four in 2011).

Education matters for health. In general, individuals with less education have more health problems and shorter life expectancies. In contrast, people with more years of education are likely to live longer, healthier lives. Data from the 2011 Missouri County-level Study showed that a high proportion of Missouri adults with less than a high school education lived in an environment that was unsafe and lacked access to healthy foods. The proportion decreased as the education level increased. A similar pattern was observed for the prevalence of risk behaviors, lack of preventive care, poor general health, and chronic diseases and conditions. In 2011, the proportion of Missouri adults aged 25 or older without a high school diploma was 31.4 percent, compared to 28.4 percent nationally.

Income and education levels vary in different areas in Missouri. Counties in the southeast region, especially those in the Bootheel area, have a higher proportion of population living in poverty and a higher proportion of adults without a high school diploma. Overall, the 2011 poverty rate was more

³ World Health Organization. Social Determinants of Health. Available from: http://www.who.int/social_determinants/en/

than twice as high among African-Americans as among whites (39% vs. 15% in Missouri and 35% vs. 13% nationally).

Urbanization

Using the method developed by the University of Washington's Rural Health Research Center,⁴ it was estimated that about 56.1 percent of the Missouri adult population 18 years and older, lived in urban core areas, 13.5 percent in sub-Urban areas, 12.9 percent in large rural towns and 17.5 percent in small rural towns or isolated rural areas in 2010. Communities at different urbanization levels differ in their environmental, demographic, social and economic characteristics, and these characteristics greatly influence the types and magnitude of health problems communities face.² The 2011 Missouri County-level Study showed that a higher proportion of Missouri adults living in a small town or isolated rural area lacked access to healthy foods in their neighborhood, had no healthcare coverage, did not meet cancer screening guidelines, engaged in risk behaviors, and had chronic conditions and diseases (arthritis, diabetes, COPD, cancer, and vision impairment), compared to residents living in other areas. In contrast, a higher proportion of adults living in the urban core area currently had asthma, and they also considered their neighborhood to be somewhat unsafe or extremely unsafe, compared to adults living in other areas (*Refer to chapter XI of the full report for data*).

Sexual Orientation

Lesbian, gay, bisexual, and transgender (LGBT) individuals are becoming more visible and acknowledged in society. Based on the self-reported data in the 2011 Missouri County-level Study, 0.8 percent of Missouri women were lesbian, 1.6 percent of men were gay, 0.7 percent of men and 1.1 percent of women were bisexual, and 0.1 percent were transgender individuals. Studies have found some significant health disparities between heterosexual adults and LGBT adults. In Missouri, LGBT individuals were more likely to smoke (32.1% vs. 23.1%), have a depressive disorder (36.9% vs. 20.1%), consider their neighborhood to be somewhat or extremely unsafe (30.0% vs. 19.2%), and have activity limitations (34.5% vs. 23.1%), compared to non-LGBT individuals.

⁴ Rural Health Research Center. RUCA. Available from: <http://depts.washington.edu/uwruca/ruca-data.php>

Progress in the Last Decade

In the last decade, significant progress has been made in Missouri in the following chronic disease health indicators:

*Decreased Burden**

Mortality Rates

From 2000 to 2009, the following age-adjusted mortality rates have decreased significantly in Missouri*:

- Heart disease mortality rate decreased by 30 percent
- All-cancer mortality rate decreased by 10.9 percent among men and decreased by 6.2 percent among women
 - Lung cancer mortality rate among men decreased by 10.1 percent
 - Breast cancer mortality rate among women decreased by 10.8 percent
 - Prostate cancer mortality rate among men decreased by 25.4 percent
 - Colorectal cancer mortality rate decreased by 17.2 percent among men and decreased by 19.9 percent from among women
- Cerebrovascular disease mortality rate decreased by 31.0 percent
- Diabetes mortality rate decreased by 20.3 percent

Hospitalization and Emergency Room Visit Rates

From 2000 to 2009 the following age-adjusted hospitalization and emergency room visit rates have decreased significantly in Missouri*:

- Heart disease hospitalization rate decreased by 18.7 percent
- Cerebrovascular disease hospitalization rate decreased by 19.0 percent
- Asthma emergency room visit rate decreased by 5.6 percent

*Significant trend or changed significantly between the beginning and the end year

Cancer Incidence Rates

From 2000 to 2008, the following age-adjusted cancer incidence rates have decreased significantly in Missouri:

- All-cancer incidence rate decreased by 7.8 percent among men and decreased by 2.0 percent among women
 - Lung cancer incidence rate among men decreased by 11.5 percent
 - Colorectal cancer incidence rate decreased by 22.1 percent among white men, by 22.8 percent among white women, and by 17.6 percent among African-American women
 - Cervical cancer incidence rate decreased by 28.3 percent

Prevalence of Chronic Diseases and Conditions

There has been little to no progress during the last decade in reducing the prevalence of chronic diseases and conditions. In fact the prevalence has increased for most chronic diseases and conditions.

Prevalence of Risk Factors

From 2000-2010

- The prevalence of smoking among adults has decreased by 22.1 percent
- The prevalence of not meeting CDC physical activity recommendation among adults has decreased by 17.2 percent
- The prevalence of heavy drinking among African-American men has decreased by 90.8 percent

From 2001 to 2009

- The prevalence of smoking among high school students has decreased by 37.6 percent

From 2003 to 2011

- The prevalence of smoking among middle school students has decreased by 38.6 percent

Improvement in Cancer Screening and Chronic Disease Care and Self-management

From 2001 to 2010

- The prevalence of ever having had a sigmoidoscopy or colonoscopy among adults age 50 years or older has increased by 51.6 percent
- The percentage of adults with diabetes who have ever attended a diabetes self-management class increased by 33.0 percent
- The percentage of African-American men with diabetes who had a flu shot in the last year increased by 453.0 percent
- The percentage of African-American men with diabetes who had ever had a pneumococcal vaccination increased by 273.1 percent

Reduced Disparities

From 2000 to 2009, racial disparity has declined in the following indicators:

- Age-adjusted diabetes mortality rates
- Age-adjusted all-cancer mortality rates
- Age-adjusted lung cancer mortality rates among men
- Age-adjusted breast cancer mortality rates among women
- Age-adjusted lung cancer incidence rates among men
- Age-adjusted cervical cancer incidence rates among women

Challenges

Missouri faces tremendous challenges in chronic disease prevention and control. The burden of chronic diseases in Missouri is likely to grow as the population ages and also because of the increasing prevalence of obesity and associated chronic conditions. In addition, there are substantial racial/ethnic and socioeconomic disparities in Missouri--minorities and people of lower socioeconomic status are disproportionately affected by chronic diseases. Furthermore, funding for chronic disease prevention and control is limited.

Aging Population

The rapid aging of the population is among the major public health challenges faced in chronic disease prevention and control. Older adults are disproportionately affected by chronic diseases, which are associated with disability, diminished quality of life, and increased costs for health care and long-term care. In Missouri in 2011, about 95 percent of seniors had at least one of the 13 aforementioned chronic diseases or conditions, more than 80 percent had at least two, and about 65 percent had at least three of these chronic diseases and conditions.

The proportion of seniors in Missouri's population was 13.5 percent in 2000 and increased to 14.0 percent in 2010. The first baby boomers turned 65 in 2011, beginning a period that will show an even faster growth of the senior population than experienced in the previous decade. By 2030, Missouri's senior population will increase to 21.0 percent.⁵ The proportion of senior population in Missouri has been and will be continuously higher than that in the nation overall.

High and Increasing Burden

Compared to the US overall, Missouri has a higher burden of ***almost all*** chronic diseases, conditions, and risk factors. Missouri's prevalence of smoking, physical inactivity, inadequate fruit and vegetable consumption, obesity, hypertension, high cholesterol and diabetes are all higher than that in the US. Furthermore, the prevalence of obesity, hypertension and diabetes are increasing significantly over time in Missouri, and at a faster pace than that in the US. Without a strong chronic disease prevention and control effort, the high prevalence of risk factors and chronic conditions will likely lead to more emergency room visits, hospitalizations, and deaths, or in another angle, there will be more disabilities, decreased quality of life, medical care spending, and lost productivity.

Racial/ethnic and Socioeconomic Disparities

There are ***substantial***, and in certain cases, ***increasing*** disparities in chronic diseases morbidity and mortality in Missouri. Minorities and people of lower socioeconomic status have a higher burden of

⁵ Office of Administration. Population Projections. Available from: <http://content.oa.mo.gov/budget-planning/demographic-information/population-projections>

most chronic diseases, conditions, and risk factors. Currently a relatively limited numbers of evidence-based interventions have been identified to address the social determinants health. However, economic development, political will, and well-coordinated efforts from multiple sectors are crucial elements for reducing health disparities and improving overall population health. Unfortunately, these conditions are hard to attain and many are out of the control of public health professionals.

Funding

Adequate funding is needed to effectively address the challenges of reducing the burden of chronic diseases among Missouri adults. Currently the majority of funding for chronic disease prevention and health promotion programs in the Department of Health and Senior Services is from federal sources. These sources are disseminated categorically; that is, for specific chronic diseases, conditions or risk factors. This presents challenges for implementing a planned, comprehensive approach for the prevention of chronic diseases. Efforts to better coordinate the funding of programs at the federal level are underway that will enable states to better coordinate chronic diseases prevention and control activities. States, too, must do their part in dedicating funding for prevention of chronic diseases. Evidence has shown that chronic disease prevention is cost effective.⁶ Investing in chronic disease prevention is not only the economically smart thing to do, it is the right thing to do.

Conclusion

The health and economic burden of chronic diseases is tremendous in Missouri and it is likely to grow as the population ages and the prevalence of obesity and associated conditions increases. Adequate funding is needed to effectively address the challenges of reducing the burden and disparities of chronic diseases among Missouri residents.

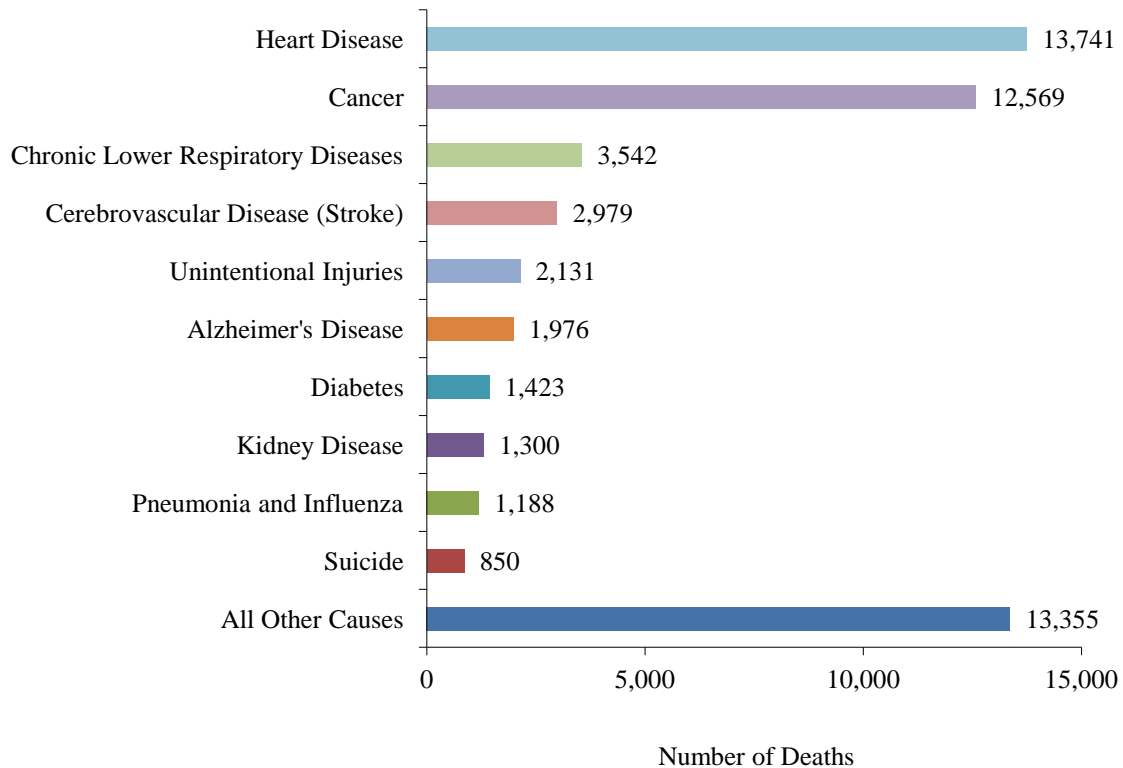
⁶ Trust for America's Health. Prevention for a healthier America: investments in disease prevention yield significant savings, stronger communities. Available from: www.healthyamericans.org/reports/prevention08.

Part One: Chronic Diseases Other than Cancer

Chapter I: Death

Leading Cause of Death

Figure 1a. Leading Causes of Death in Missouri, 2010

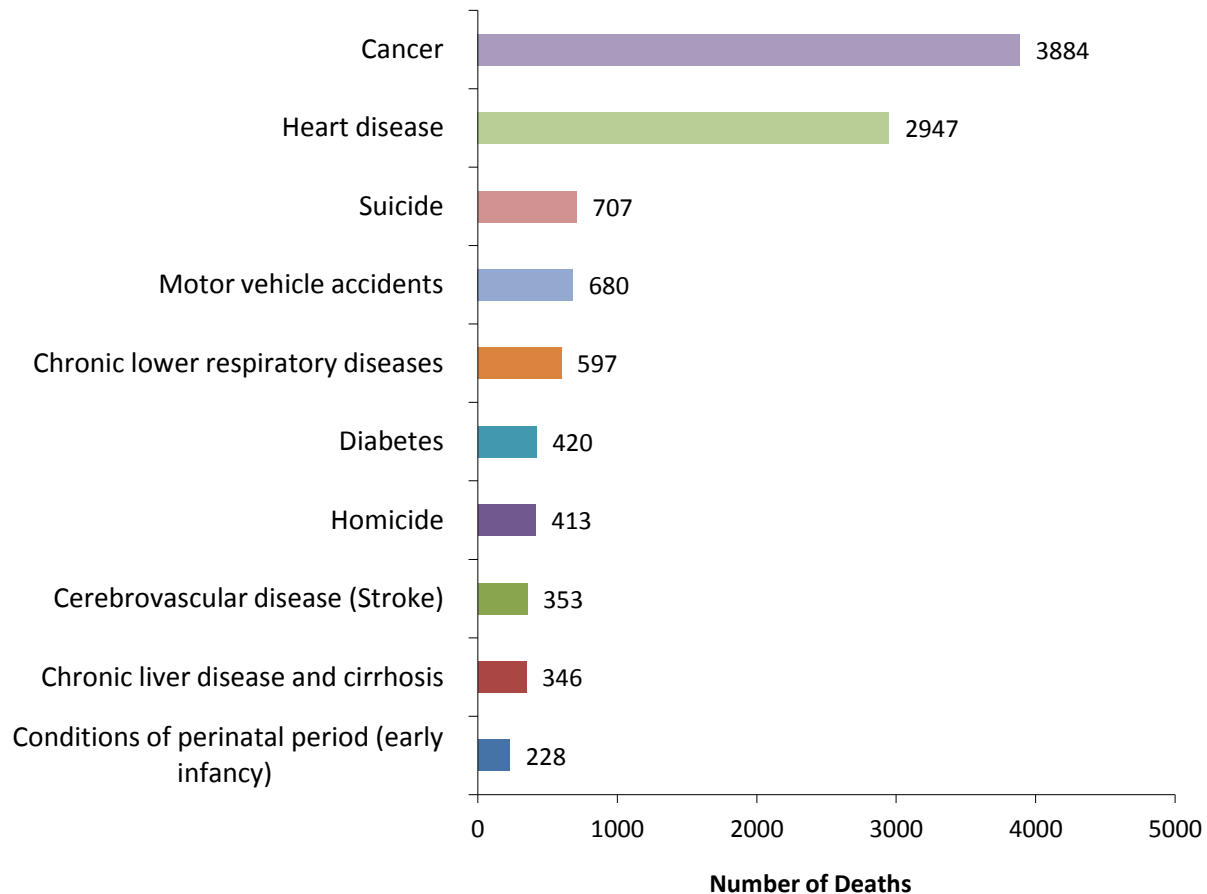


In Missouri, chronic diseases are major causes of death. In 2010, a total of 55,054 Missourians died and about 71 percent of these deaths were due to chronic diseases. Heart disease was the number one killer, accounting for 25.0 percent of all deaths; followed by cancer at 22.8 percent; chronic lower respiratory disease, 6.4 percent; stroke, 5.4 percent; and diabetes, 2.6 percent. In total, these five causes in Missouri accounted for 62.2 percent of all deaths in 2010 (Figure 1a).

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Leading Cause of Premature Death

Figure 1b. Leading Causes of Premature Death in Missouri, 2010

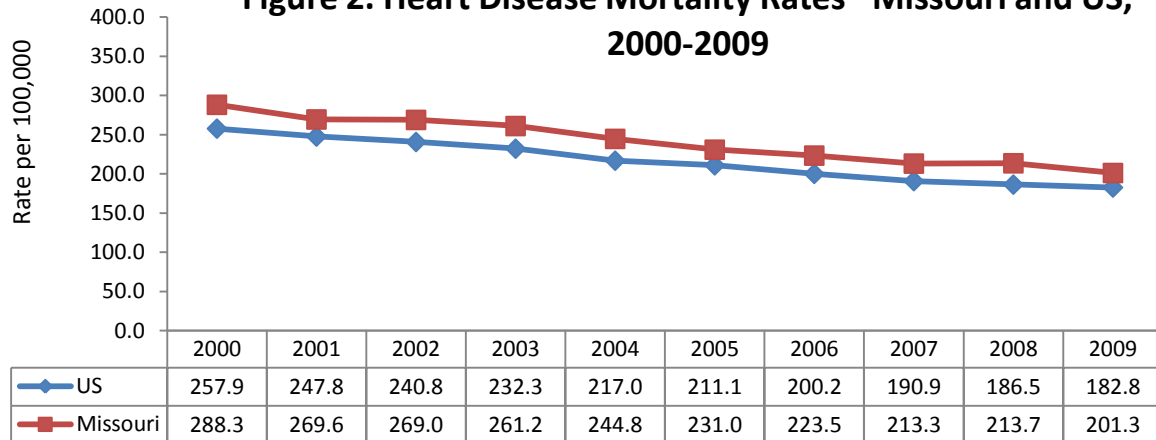


Chronic diseases are also major causes of premature death in Missouri. In 2010, a total of 14,827 Missourians died prematurely under the age of 65 and more than 59 percent of these deaths were due to chronic diseases. Cancer was the number one cause of premature deaths, accounting for more than 26.2 percent of premature death; followed by heart disease, accounting for about 19.9 percent; chronic lower respiratory disease, 4.0 percent; diabetes, 2.8 percent; cerebrovascular disease, 2.4 percent (Figure 1b).

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

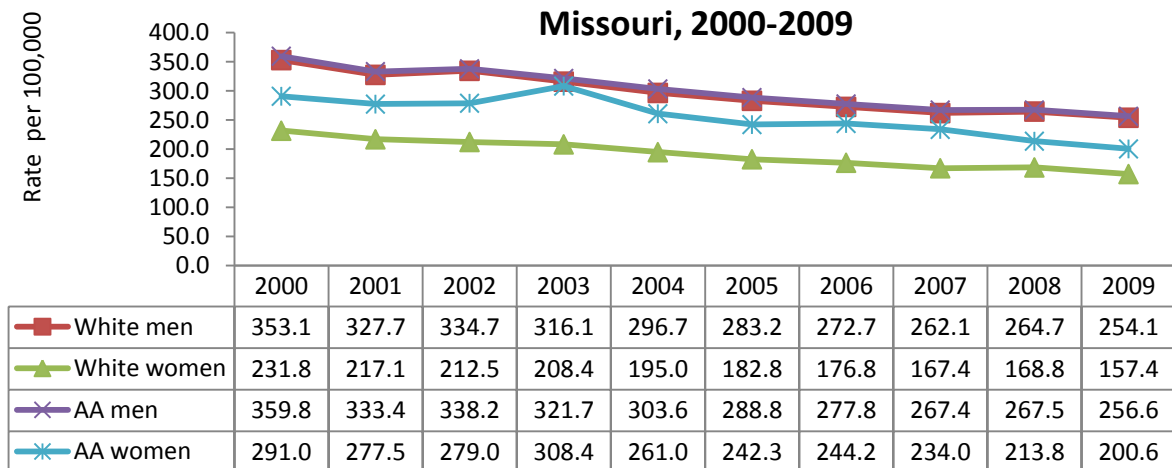
Heart Disease

Figure 2. Heart Disease Mortality Rates* Missouri and US, 2000-2009



Heart disease mortality rates decreased significantly both in the US and in Missouri in the last decade. But Missouri's rates have been consistently higher than the US rates (Figure 2).

Figure 3. Heart Disease Mortality Rates*, by Race and Sex, Missouri, 2000-2009



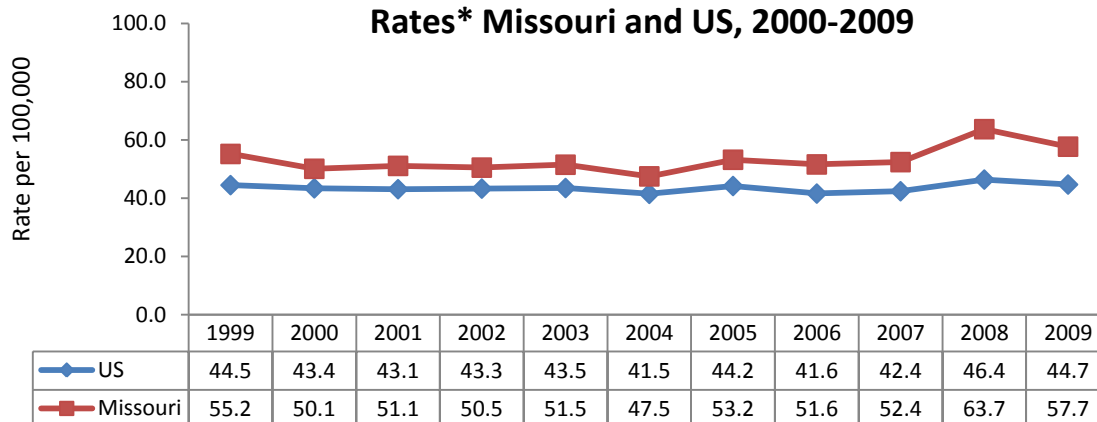
The mortality rates have been declining significantly in all four racial and gender groups. Men had higher mortality rates than women for both races. African-American women had significantly higher mortality rates than white women (Figure 3).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

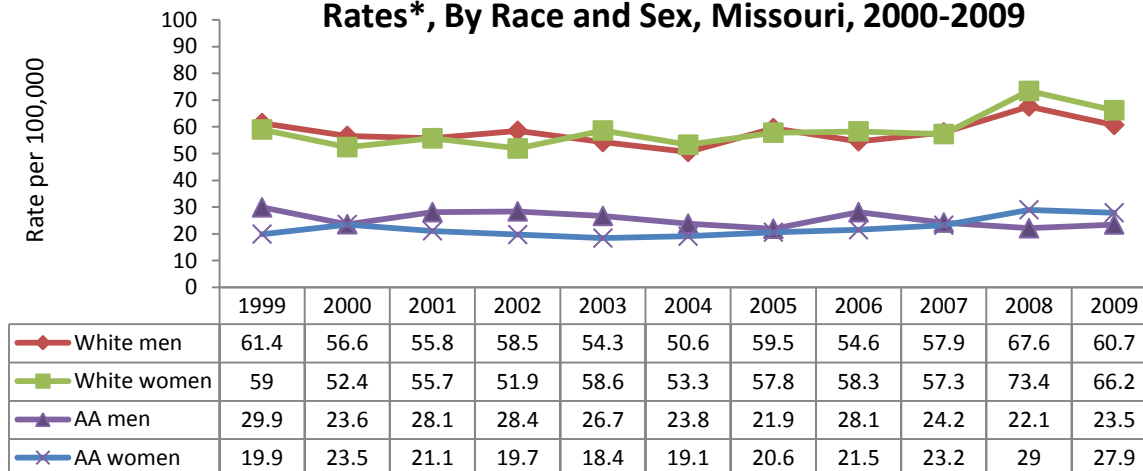
Chronic Lower Respiratory Disease

Figure 4. Chronic Lower Respiratory Disease Mortality Rates* Missouri and US, 2000-2009



The chronic lower respiratory mortality rates were significantly higher in Missouri than the US in the last decade. There was no significant trend in either Missouri or the US (Figure 4). Since 2008, chronic lower respiratory disease has become the third leading cause of death in both Missouri and the US.

Figure 5. Chronic Lower Respiratory Disease Mortality Rates*, By Race and Sex, Missouri, 2000-2009



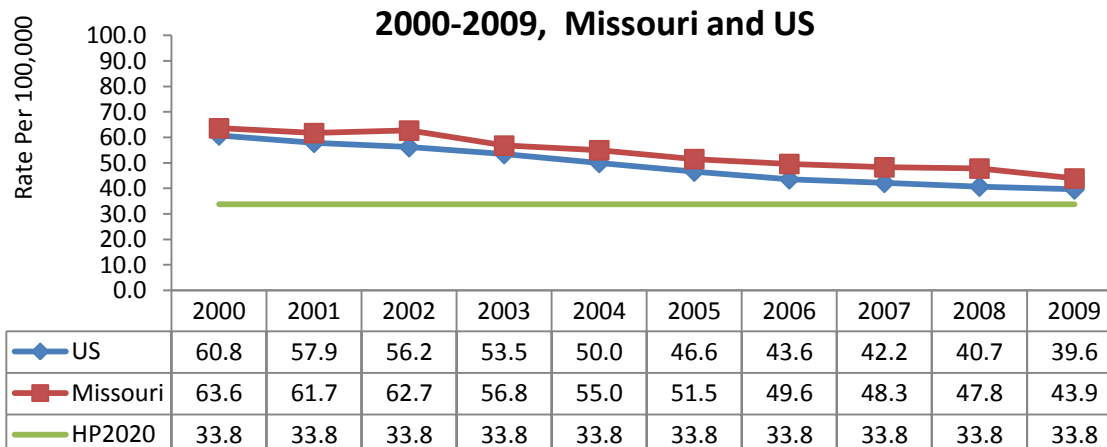
White men and women had significantly higher chronic lower respiratory disease mortality rates than African-American men and women. There was a significant upward trend among white women and African-American women (Figure 5).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

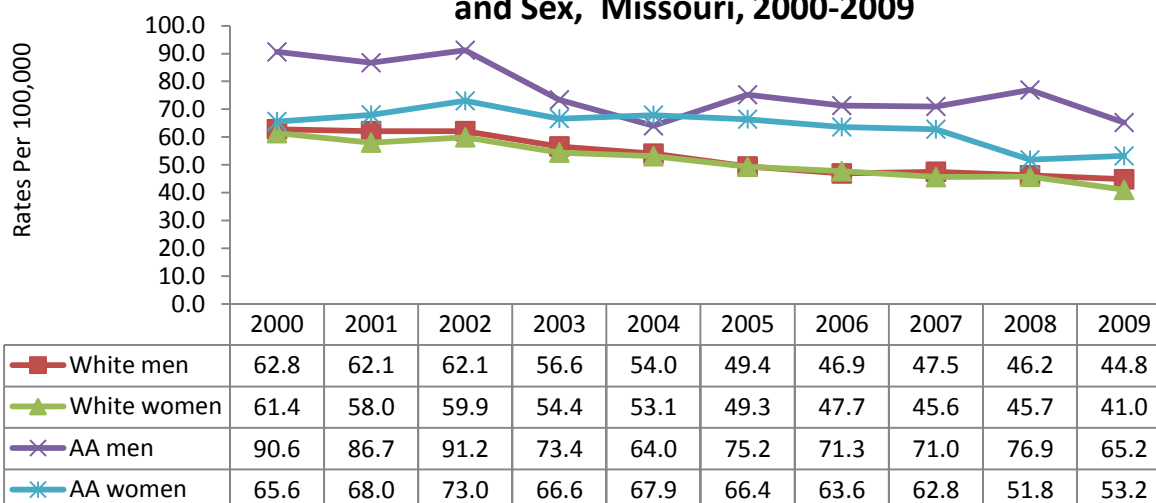
Cerebrovascular Disease (Stroke)

**Figure 6. Cerebrovascular Disease Mortality Rates*
2000-2009, Missouri and US**



There is a significant downward trend in cerebrovascular mortality rates in the US and Missouri. Missouri rates have been significantly higher than US rates in the last decade (Figure 6). The cerebrovascular disease mortality rate has decreased significantly in all four racial and

**Figure 7. Cerebrovascular Disease Mortality Rates*, by Race
and Sex, Missouri, 2000-2009**



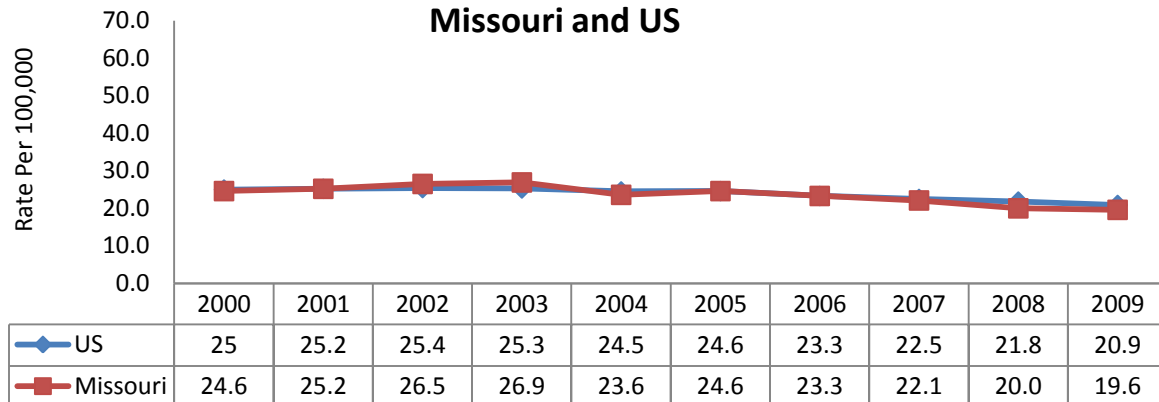
gender groups. However, there was still a disparity between African Americans and whites in 2009. Among African Americans, men had higher mortality rates than women (Figure 7).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

Diabetes

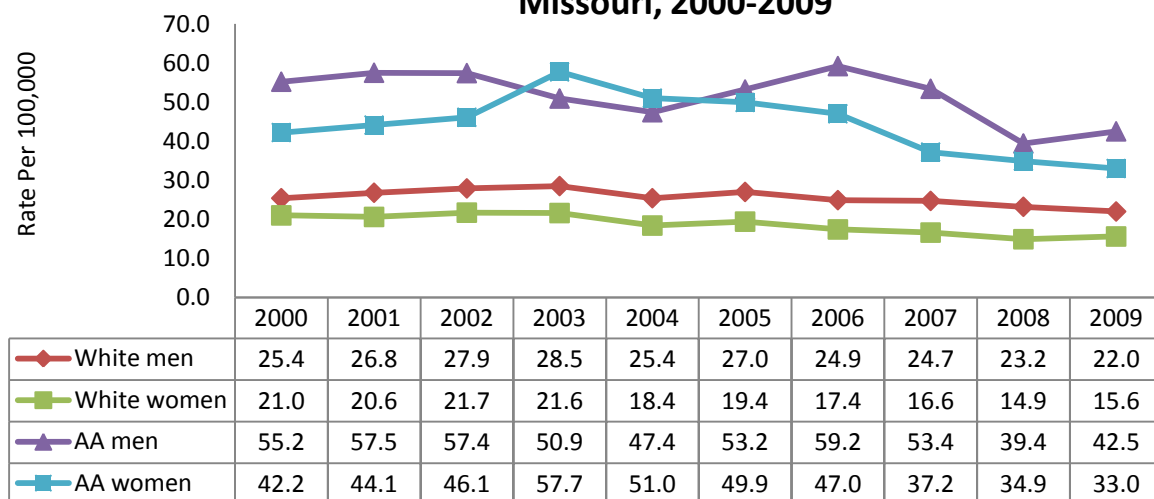
Figure 8. Diabetes Mortality Rates*2000-2009, Missouri and US



The diabetes death rate decreased significantly in both the US and Missouri (Figure 8).

Missouri's rates were similar to US rates.

Figure 9. Diabetes Mortality Rates*, by Race and Sex, Missouri, 2000-2009



The decline in diabetes mortality rates was significant among white men and women and African-American men in the last decade and among African-American women during 2003-2009. African-American men and women had significantly higher rates than white men and women (Figure 9).

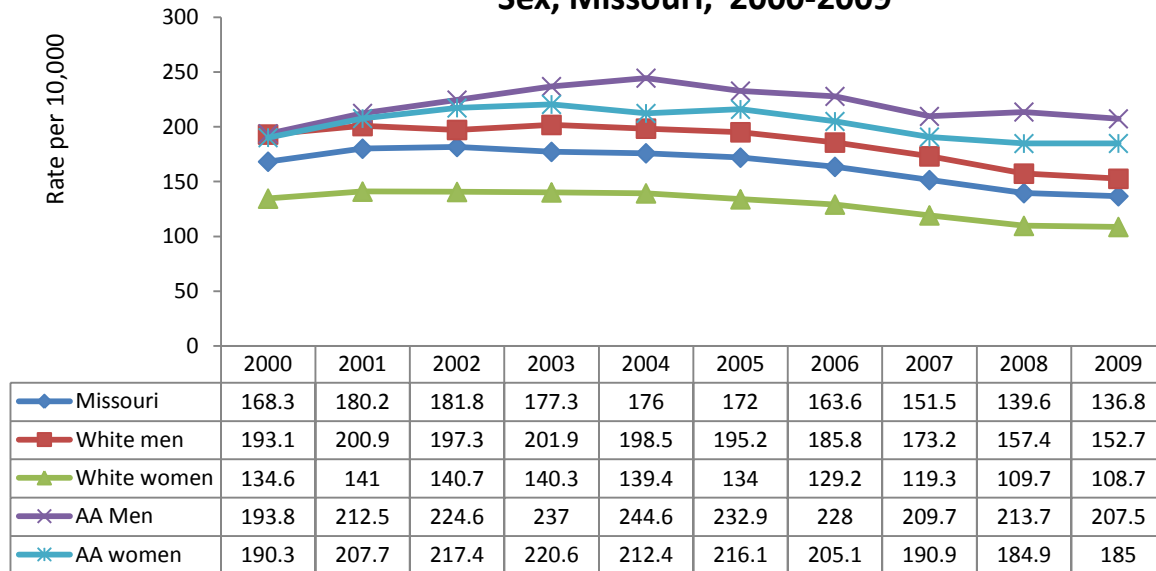
*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

Chapter II: Hospitalization

Heart Disease

Figure 10. Heart Disease Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009



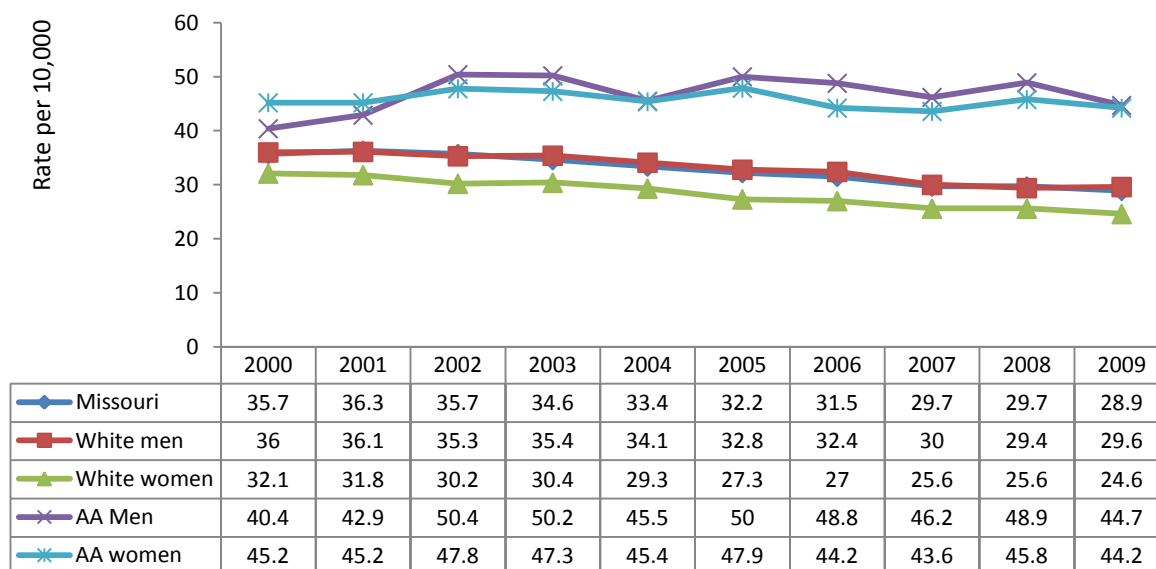
A significant decline in heart disease hospitalization rates was observed in the last decade at the state level and among white men and women (Figure 10).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Cerebrovascular Disease (Stroke)

Figure 11. Cerebrovascular Disease Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009



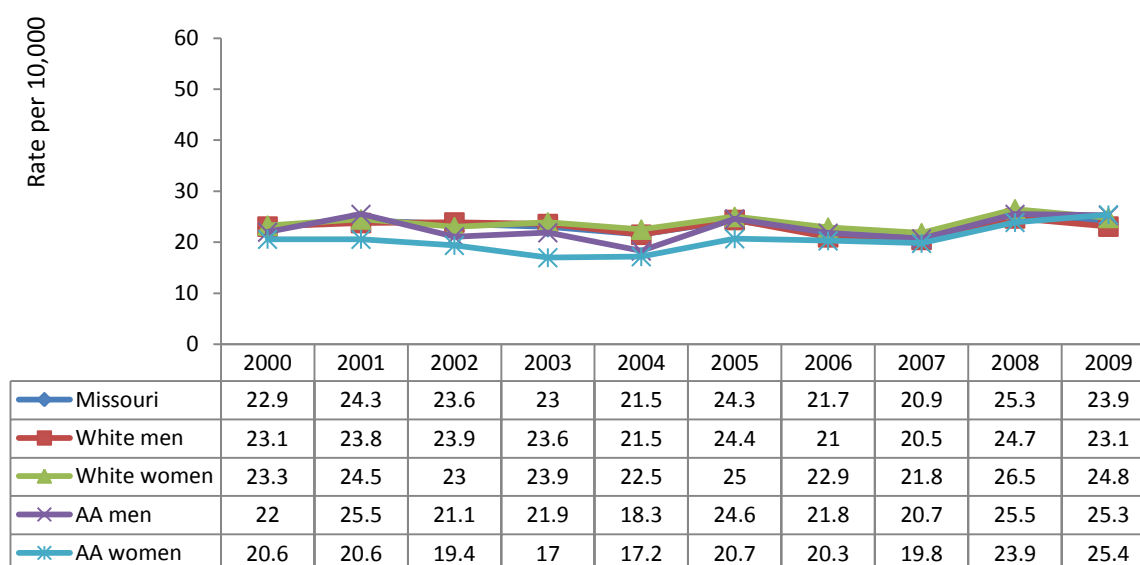
Cerebrovascular disease hospitalization rates declined significantly among white men and women and the state overall in the last decade. The rates were significantly higher among African-American men and women than white men and women (Figure 11).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Chronic Obstructive Pulmonary Disease (COPD)

Figure 12. Chronic Obstructive Pulmonary Disease Hospitalization Rates*, by Race and Sex, Missouri 2000-2009



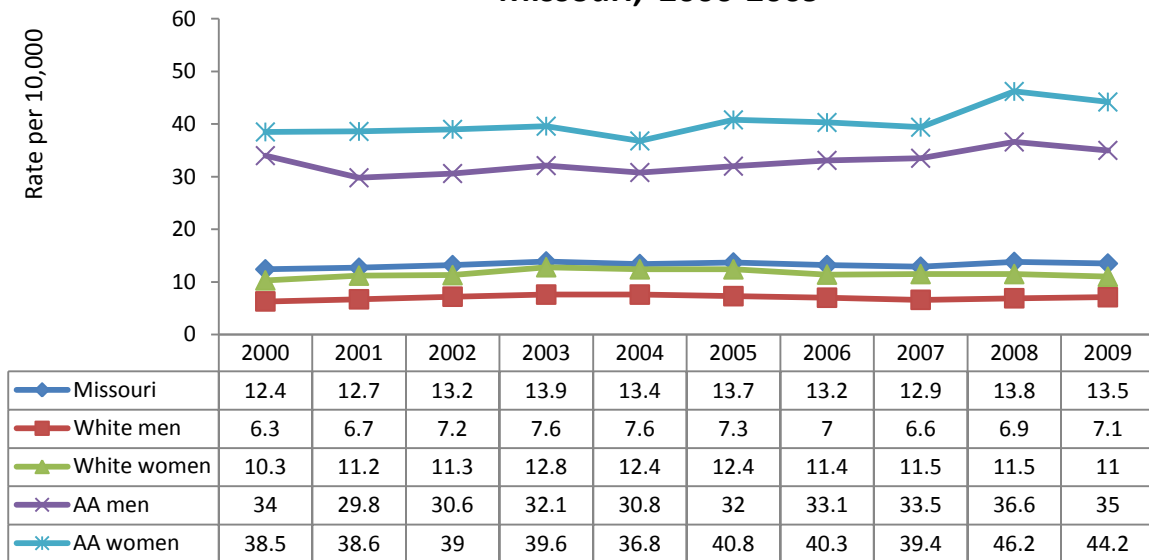
There were no significant trend in the chronic obstructive pulmonary disease hospitalization rates either at the state level or among any of the racial and gender groups (Figure 12).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Asthma

Figure 13. Asthma Hospitalization Rates* by Race and Sex, Missouri, 2000-2009



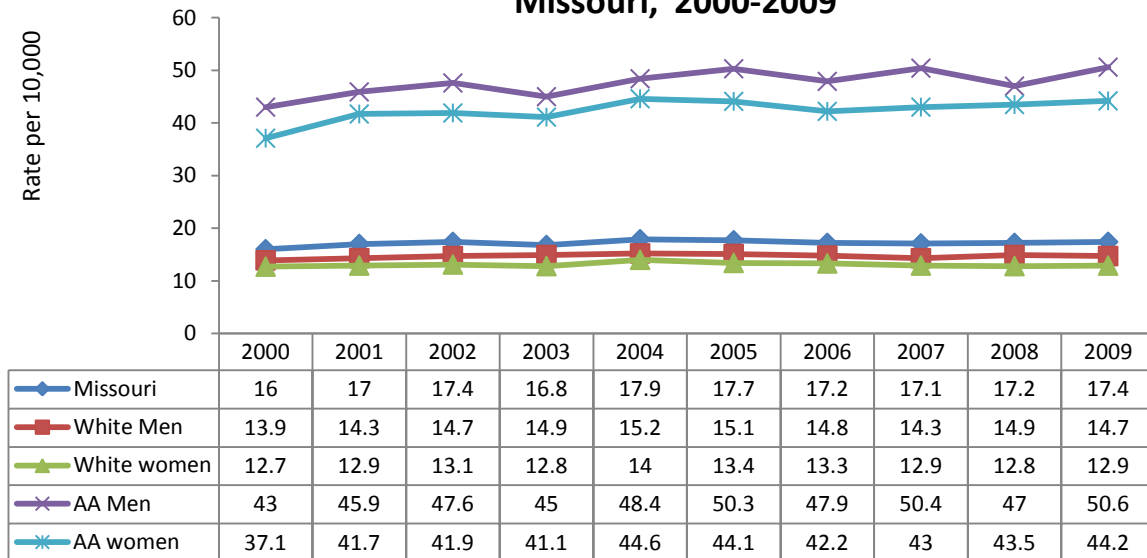
The asthma hospitalization rates were significantly higher among African-American men and women than white men and women. Also, there was a significant upward trend in the asthma hospitalization rates for African-American men and women (Figure 13).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Diabetes

Figure 14. Diabetes Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009



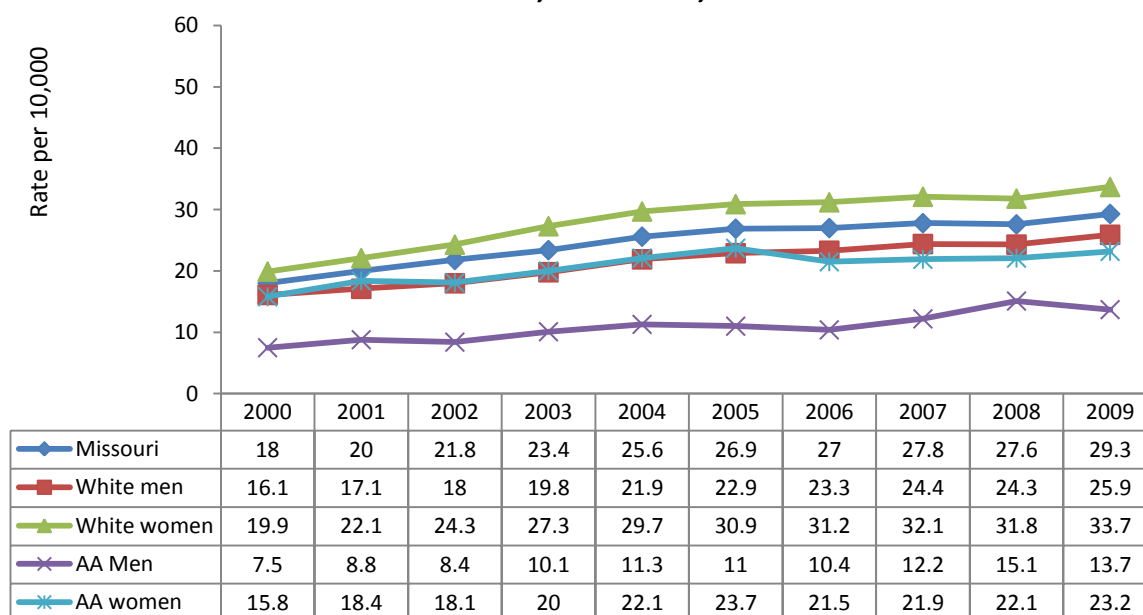
The diabetes hospitalization rates were significantly higher among African-American men and women than white men and women. There has been a significant upward trend in the diabetes hospitalization rates among African-American men and women (Figure 14).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Arthritis (Osteoarthritis)

Figure 15. Osteoarthritis Hospitalization Rates*, by Race and Sex, Missouri, 2000-2009



Osteoarthritis hospitalization rates were significantly higher among white men and women than among African-American men and women. A significant rise in osteoarthritis hospitalization rates was observed in the last decade for all racial and gender groups, and in the state overall (Figure 15). Obesity is a major risk factor for osteoarthritis and a contributing factor to the rise in the hospitalization rates.

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Chapter III: Emergency Room Visit

Heart Disease

Figure 16. Heart Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009



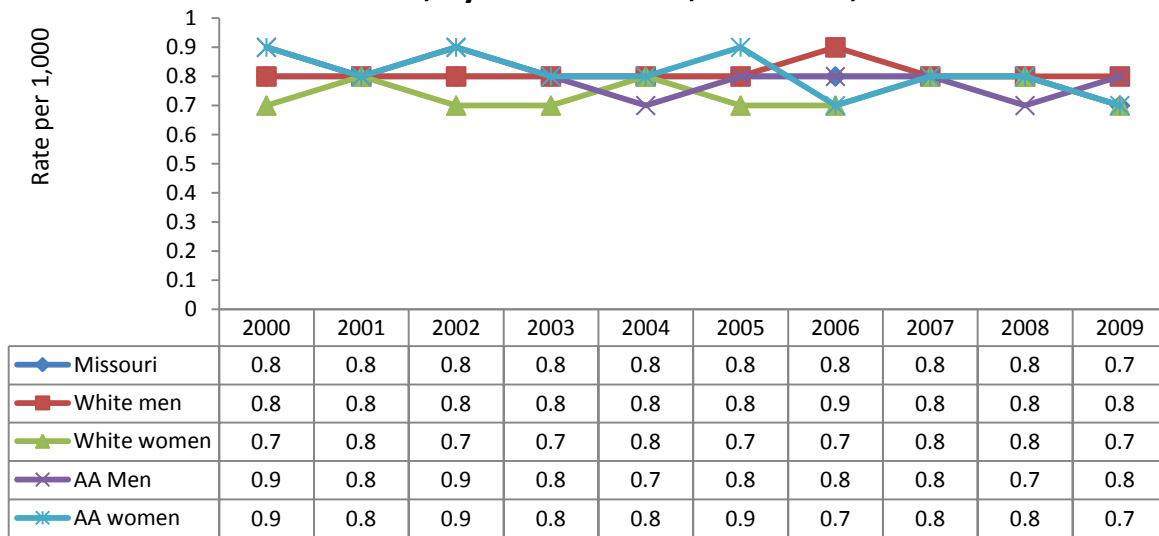
The heart disease emergency room visit rates were higher among African-American men and women than white men and women. A significant upward trend was observed at the state level and among all racial and gender groups, except white men (Figure 16).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Stroke

Figure 17. Cerebrovascular Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009



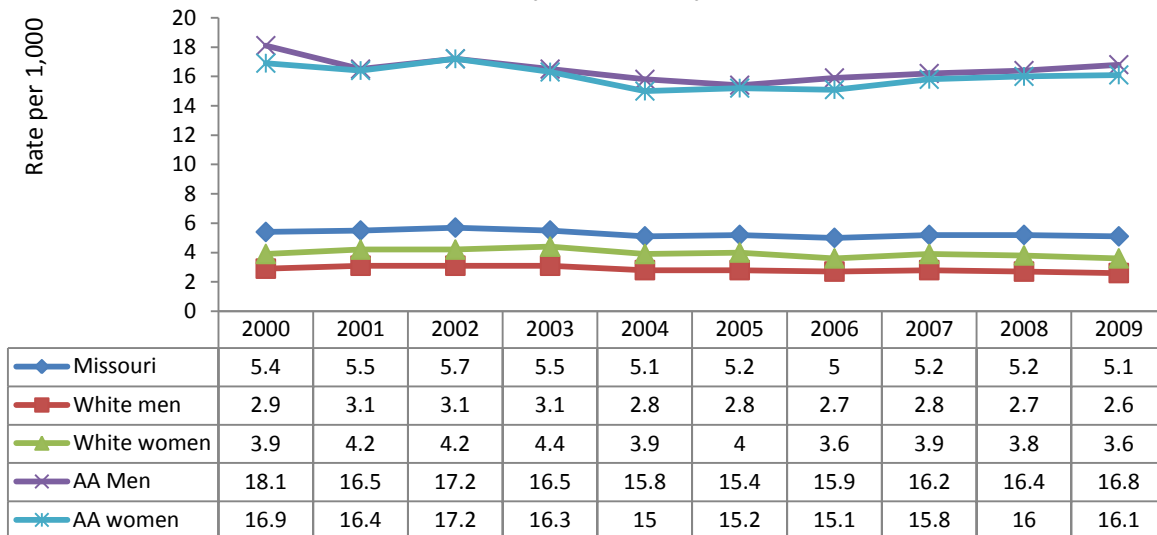
There was no significant trend in the cerebrovascular disease emergency room visit rates at the state level and among all racial and gender groups (Figure 17). Rates were similar among all racial and gender groups.

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Asthma

Figure 18. Asthma Emergency Room Visit Rate*, by Race and Sex, Missouri, 2000-2009



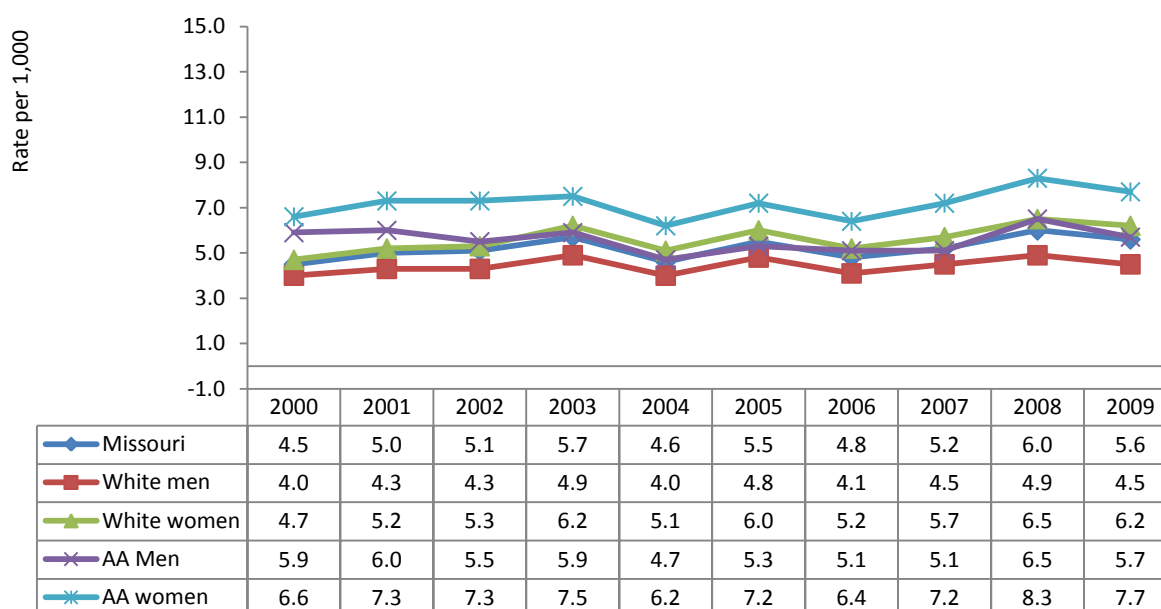
The asthma emergency room visit rates were significantly higher among African-American men and women than white men and women in 2009. Significant downward trends were observed at the state level and among white men and women (Figure 18).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

COPD

Figure 19. Chronic Obstrutive Pulmonary Disease Emergency Room Visit Rates*, by Race and Sex, Missouri, 2000-2009



The COPD emergency room visit rate increased significantly from 2000 to 2009 for the state, and among white men and women, and African-American women (Figure 19).

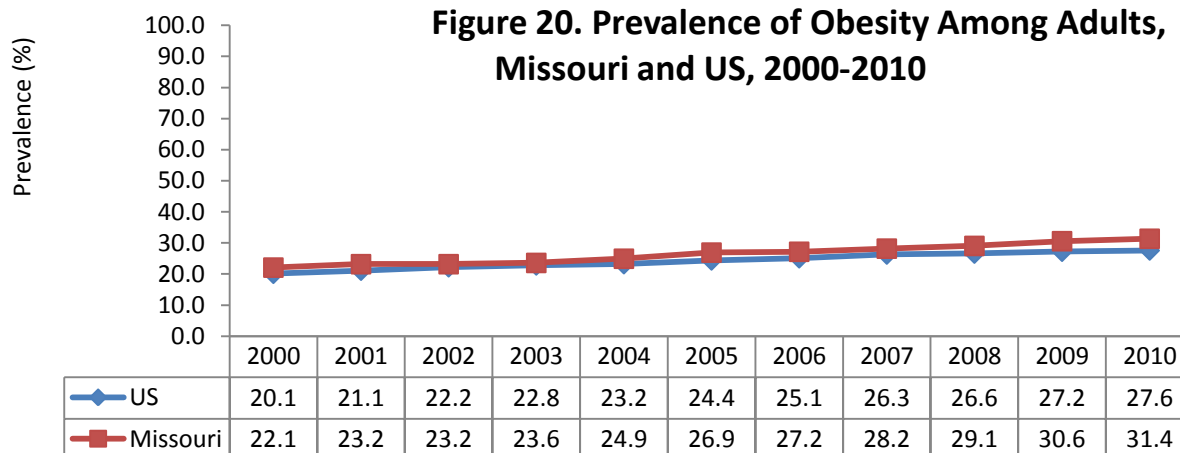
*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services

Chapter IV: Prevalence of Chronic Conditions and Diseases

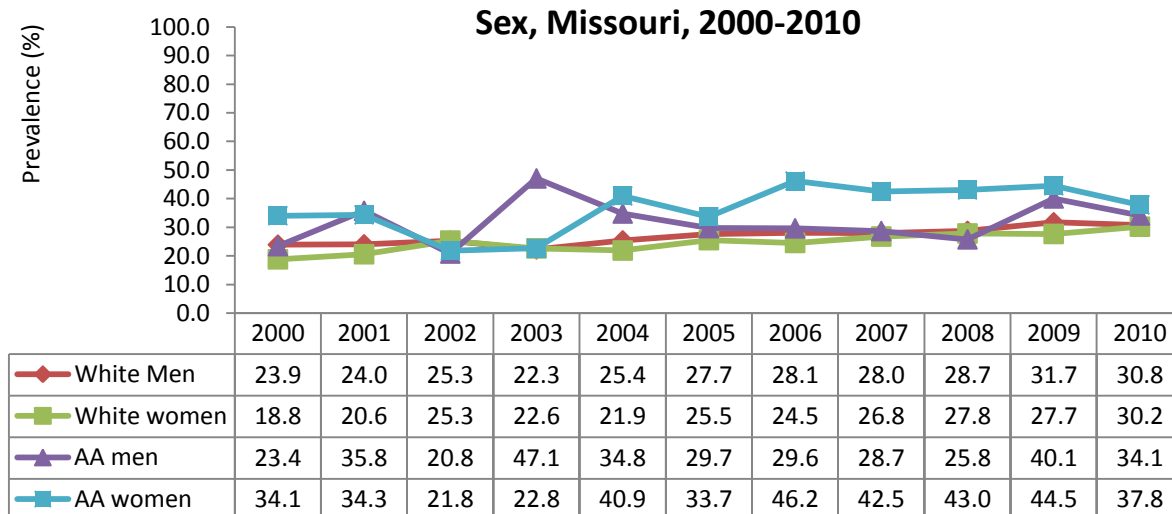
Obesity

Figure 20. Prevalence of Obesity Among Adults, Missouri and US, 2000-2010



The prevalence of obesity has increased at about one percentage point per year in the last decade in Missouri, which is slightly faster than the increase in the US (Figure 20). The prevalence in

Figure 21. Prevalence of Obesity Among Adults, by Race and Sex, Missouri, 2000-2010

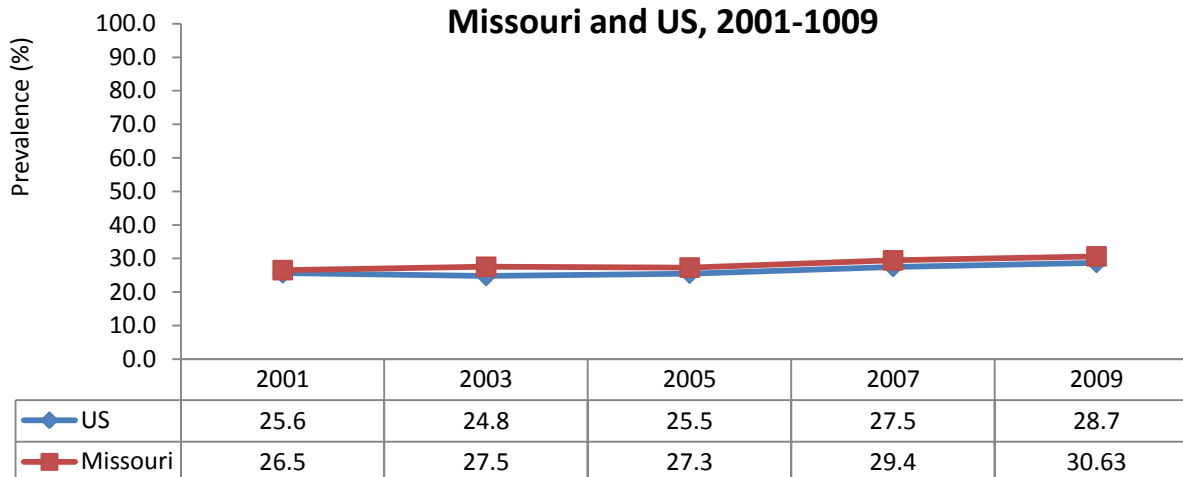


Missouri was consistently higher than that in the US. In general, African Americans had a higher prevalence than whites. The upward trend was significant for white men and women, and African-American women. The increase rate was highest among African-American women at about one and one-half percentage points per year in the last decade (Figure 21).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

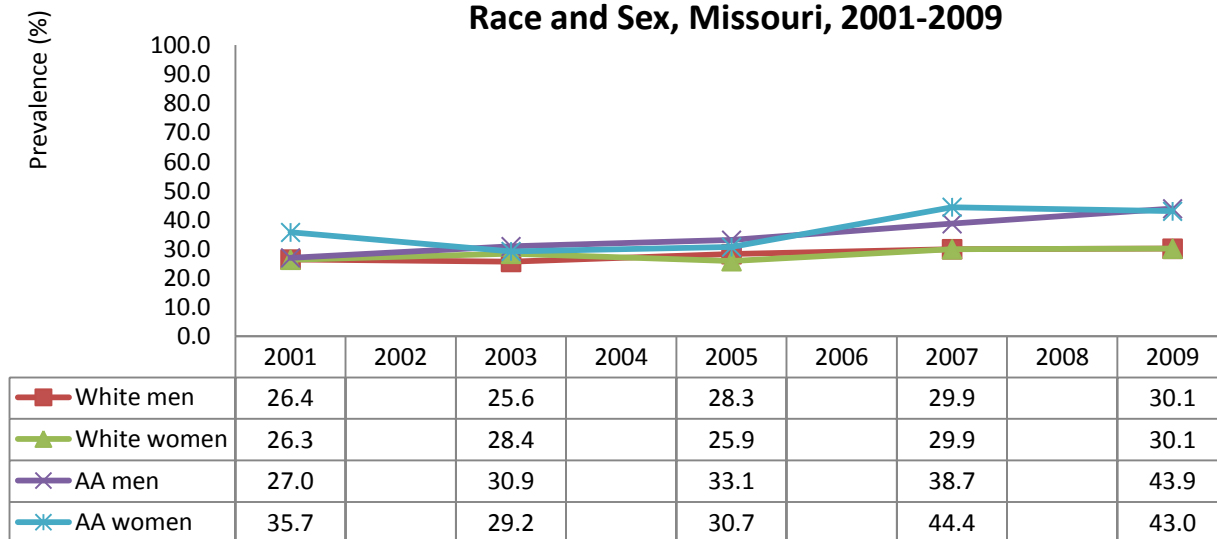
High Blood Pressure

Figure 22. Prevalence of High Blood Pressure among Adults, Missouri and US, 2001-2009



Parallel to the US, hypertension prevalence has increased about one-half of a percentage point each year in the last decade in Missouri (Figure 22). Missouri's prevalence was higher than the US.

Figure 23. Prevalence of High Blood Pressure among Adults, by Race and Sex, Missouri, 2001-2009

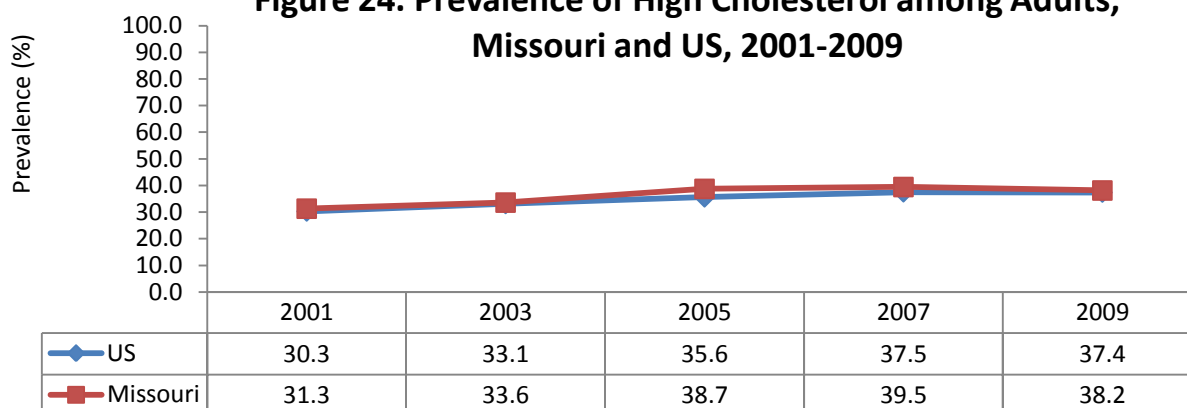


There was a significant upward trend in the prevalence of hypertension for both white men and African-American men. The racial disparity has increased in the last decade (Figure 23).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

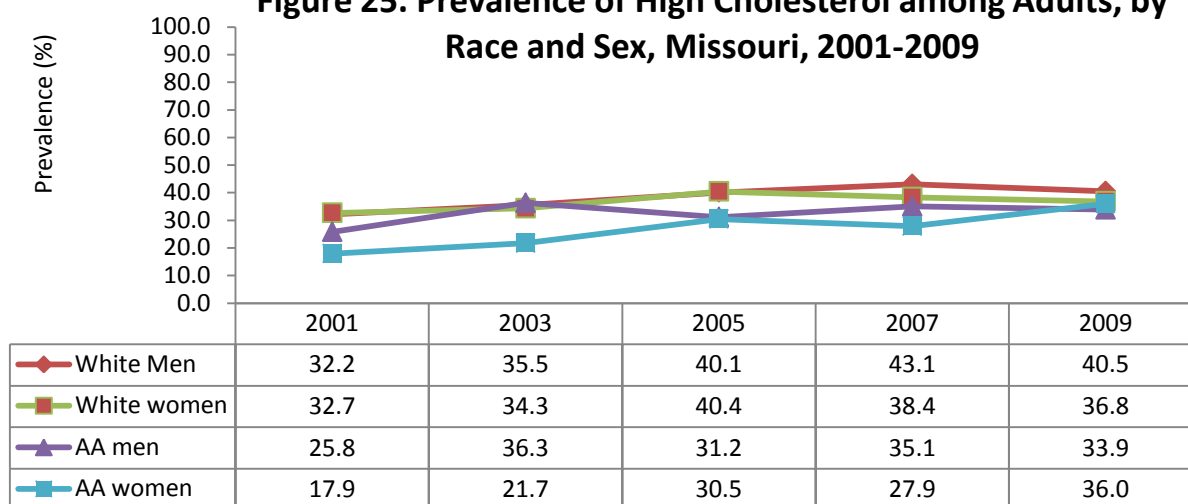
High Blood Cholesterol

Figure 24. Prevalence of High Cholesterol among Adults, Missouri and US, 2001-2009



Significant upward trends in the prevalence of high cholesterol among adults who ever checked their blood cholesterol were observed in both Missouri and the US. The prevalence was higher in Missouri than in the US (Figure 24).

Figure 25. Prevalence of High Cholesterol among Adults, by Race and Sex, Missouri, 2001-2009

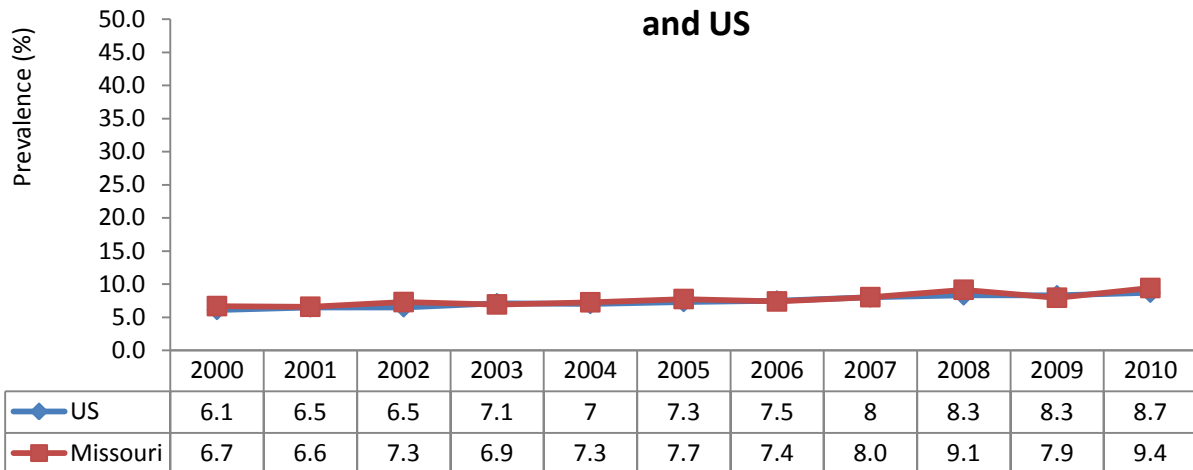


The prevalence of high cholesterol among adults was lower among African-American women in the early 2000's. However, there has been a significant upward trend for white men and African-American women. The difference between African-American women and white women has decreased (Figure 25).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

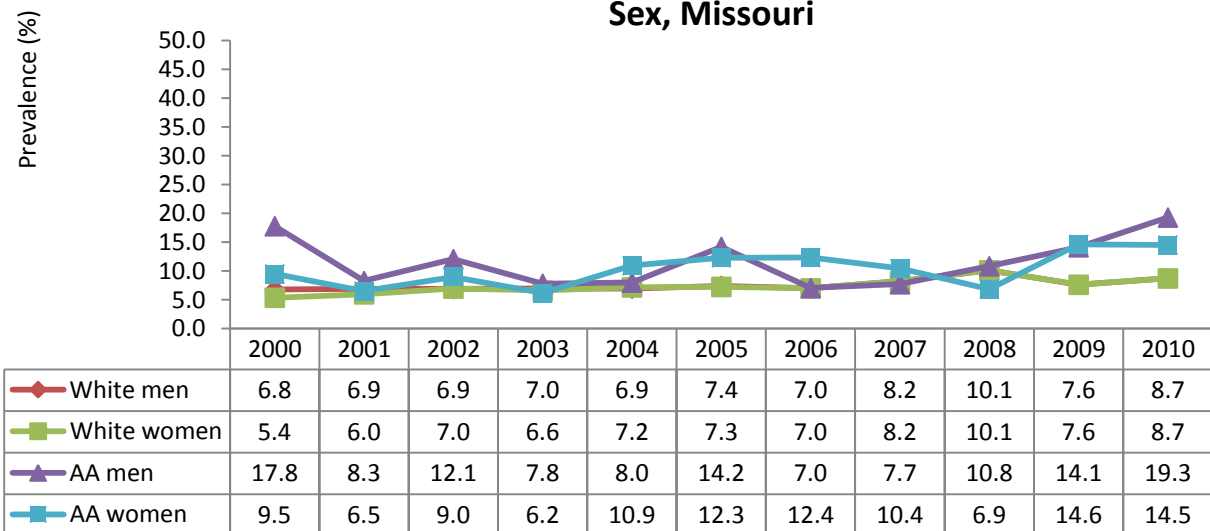
Diabetes

Figure 26. The Prevalence of Diabetes among Adults, Missouri and US



The upward trend was significant for both US and Missouri. In 2010, Missouri's prevalence was slightly higher than the US prevalence (Figure 26).

Figure 27. Prevalence of Diabetes among Adults, by Race and Sex, Missouri

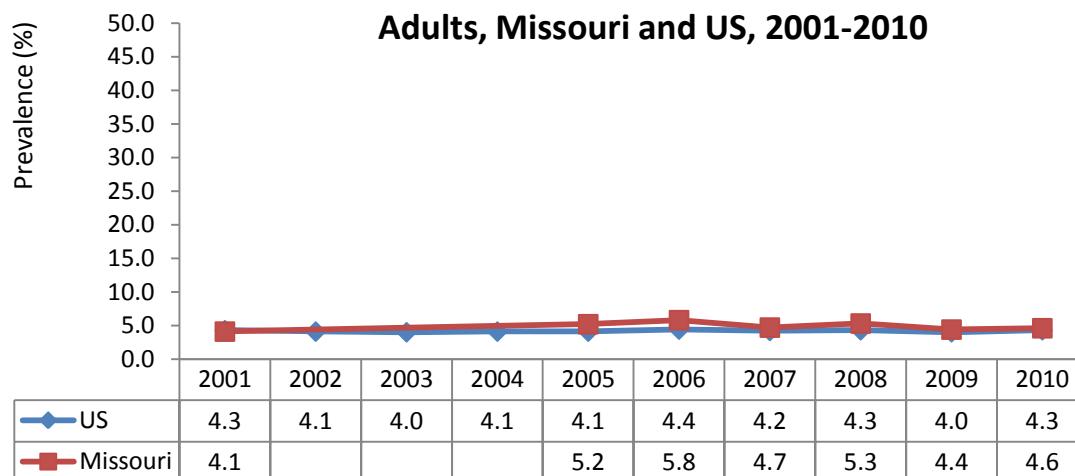


There was a significant upward trend in the prevalence of diabetes for white men and women, and African-American women. Due to fluctuations in prevalence, the trend was not significant for African-American men (Figure 27).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

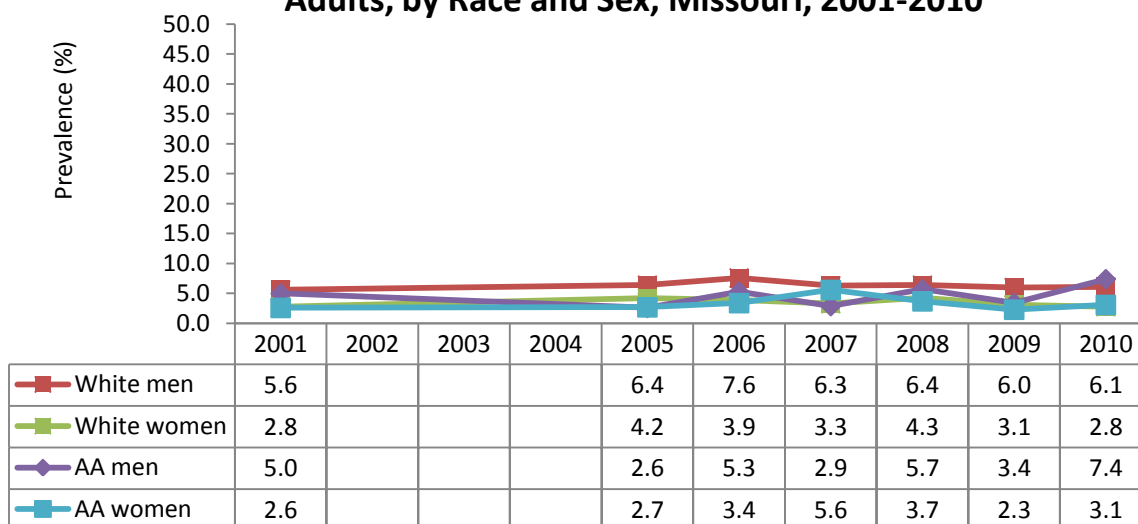
Heart Attack Survivors

Figure 28. Prevalence of Heart Attack Survivors among Adults, Missouri and US, 2001-2010



The prevalence of heart attack survivors has remained relatively consistent in Missouri and in the US. Missouri's prevalence has been slightly higher than the US prevalence. Missouri data from 2002-2004 were not collected (Figure 28).

Figure 29. Prevalence of Heart Attack Survivors among Adults, by Race and Sex, Missouri, 2001-2010

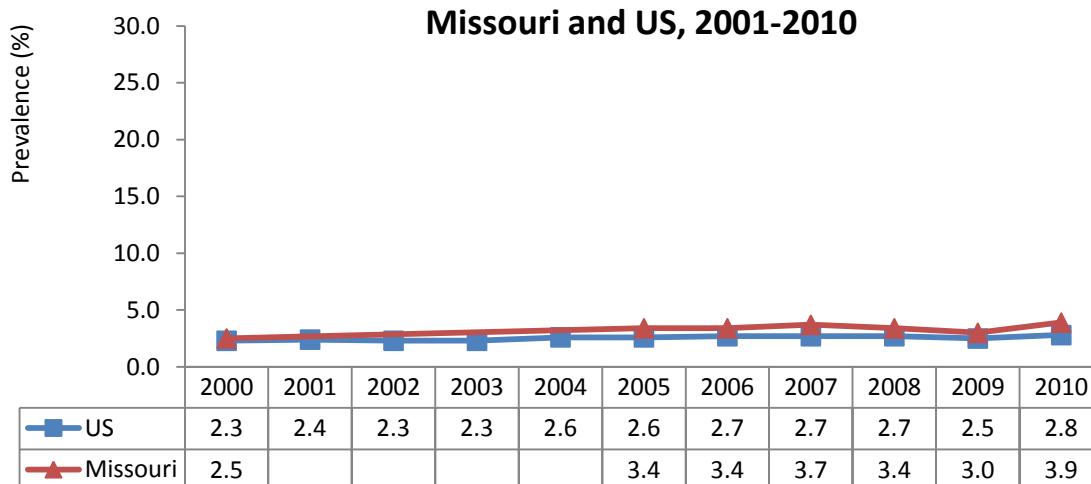


There was no significant trend in the prevalence of heart attack survivors for any racial and gender group (Figure 29).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

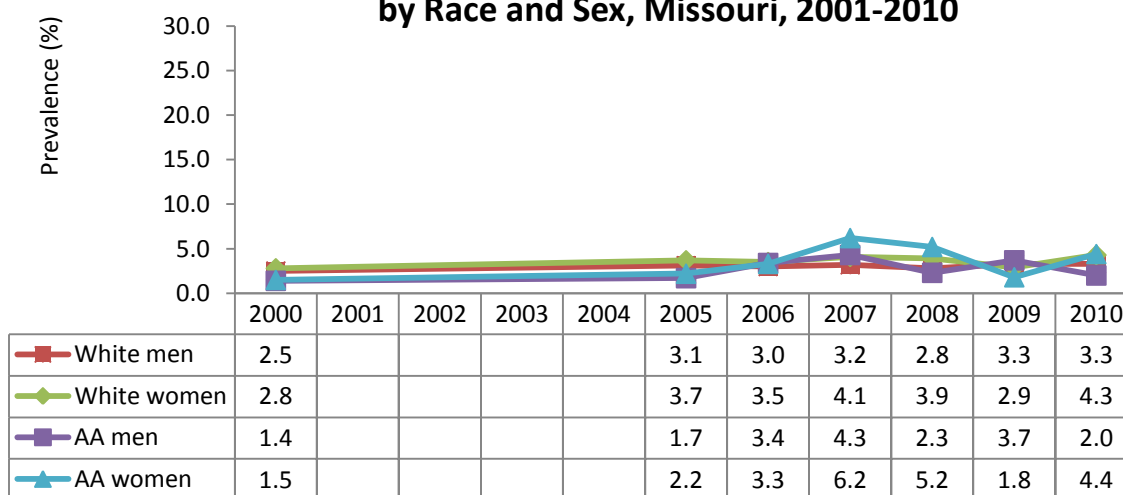
Stroke Survivors

Figure 30. Prevalence of Stroke Survivors among Adults, Missouri and US, 2001-2010



There was a significant upward trend in the prevalence of stroke survivors in the US, but not in Missouri. Missouri data was not collected between 2002 and 2004. Whenever data were available, Missouri's prevalence has been slightly higher than the US (Figure 30).

Figure 31. Prevalence of Stroke Survivors among Adults, by Race and Sex, Missouri, 2001-2010

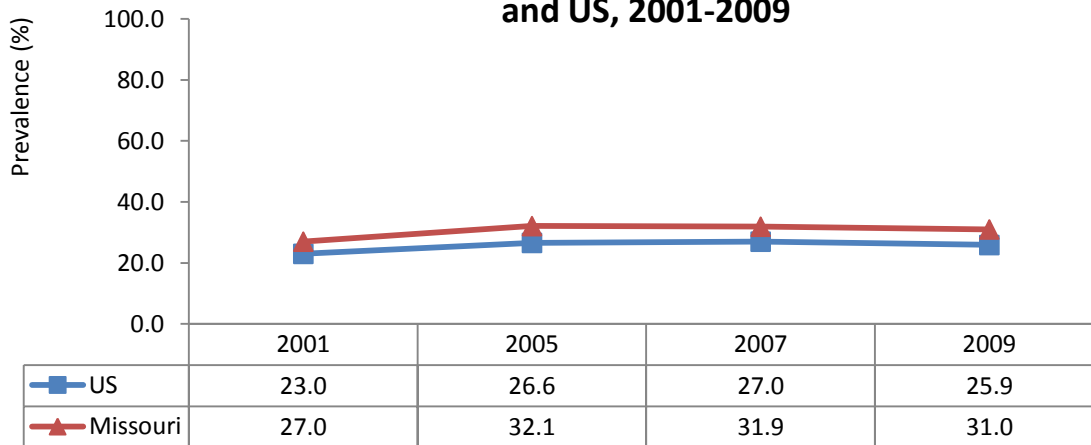


There was no significant trend in the prevalence of stroke survivors in any racial and gender groups in Missouri. Missouri data was not collected between 2002 and 2004 (Figure 31).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

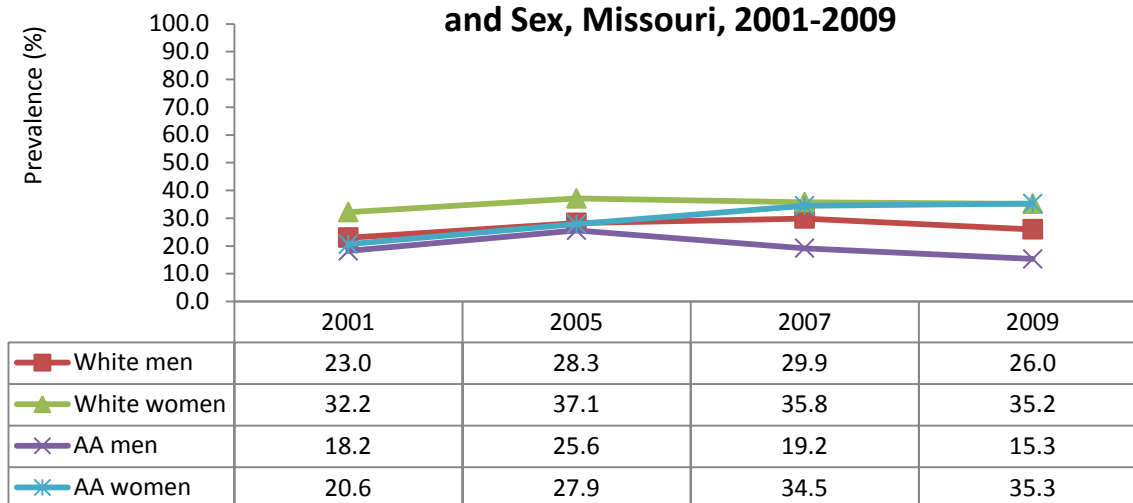
Arthritis

Figure 32. Prevalence of Arthritis among Adults, Missouri and US, 2001-2009



The prevalence of arthritis in Missouri has been consistently higher than that in the US (Figure 32). No significant trend was observed in either US or Missouri.

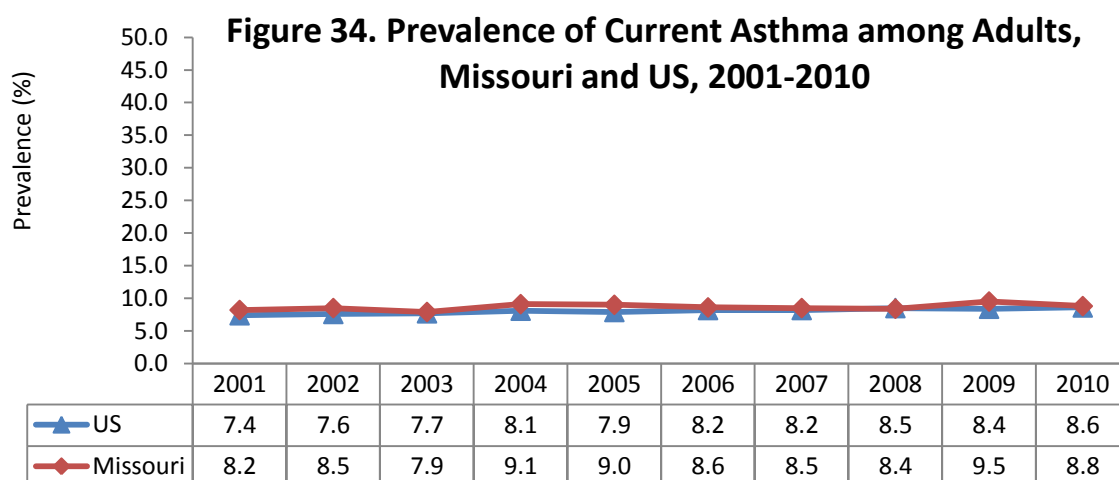
Figure 33. Prevalence of Arthritis among Adults, by Race and Sex, Missouri, 2001-2009



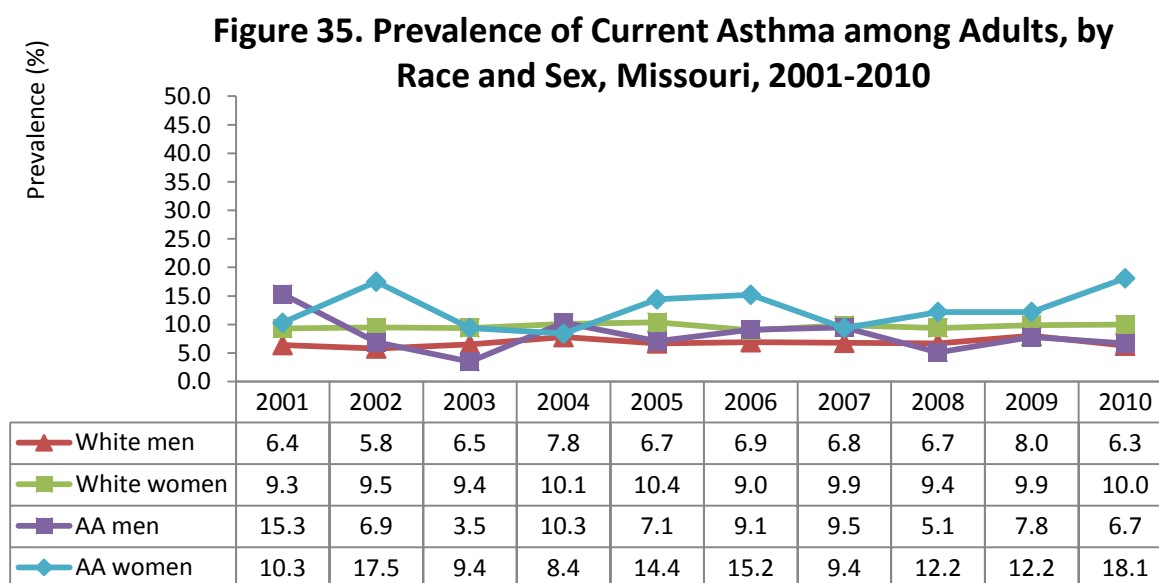
There was a significant upward trend in the prevalence of arthritis only among African-American women (Figure 33). Previously, white women had a higher prevalence, but the difference between white women and African-American women has declined in the last decade.

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Current Asthma



There was a significant upward trend in the prevalence of current asthma in the US and Missouri. Missouri's prevalence has been slightly higher than the US prevalence (Figure 34).



There was no significant trend in the prevalence of current asthma in any racial and gender groups in Missouri (Figure 35). The prevalence tends to be higher among African-American women.

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Multiple Chronic Diseases and Conditions

Figure 36: Prevalence of Chronic Diseases and conditions among All Adults and Seniors, Missouri, 2011

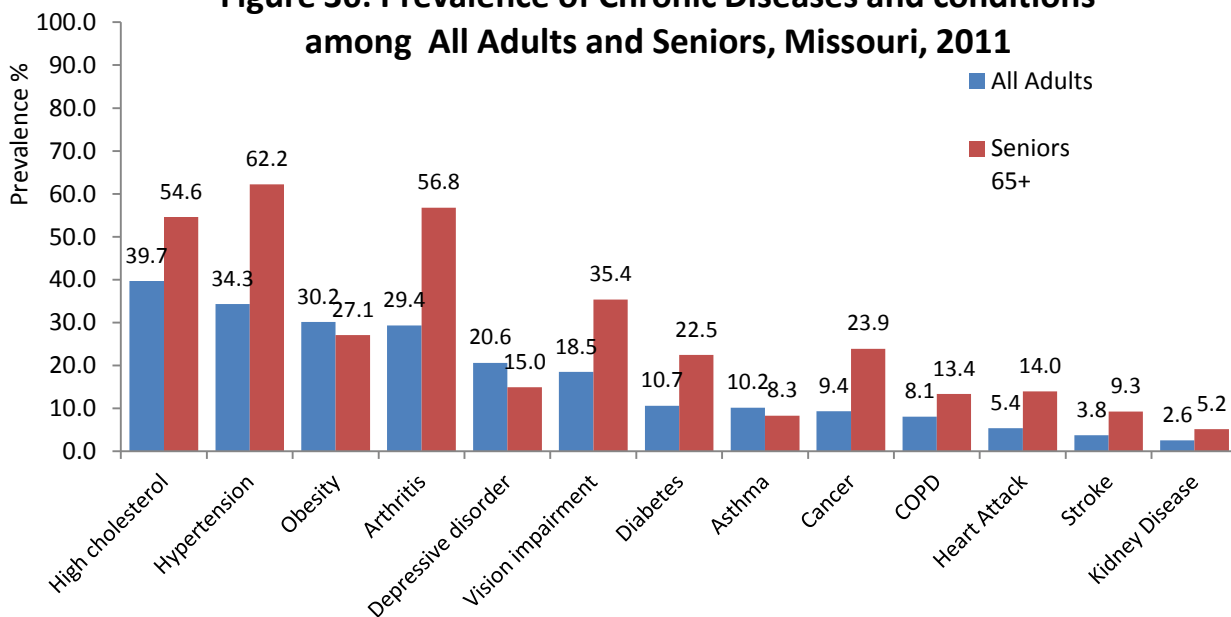
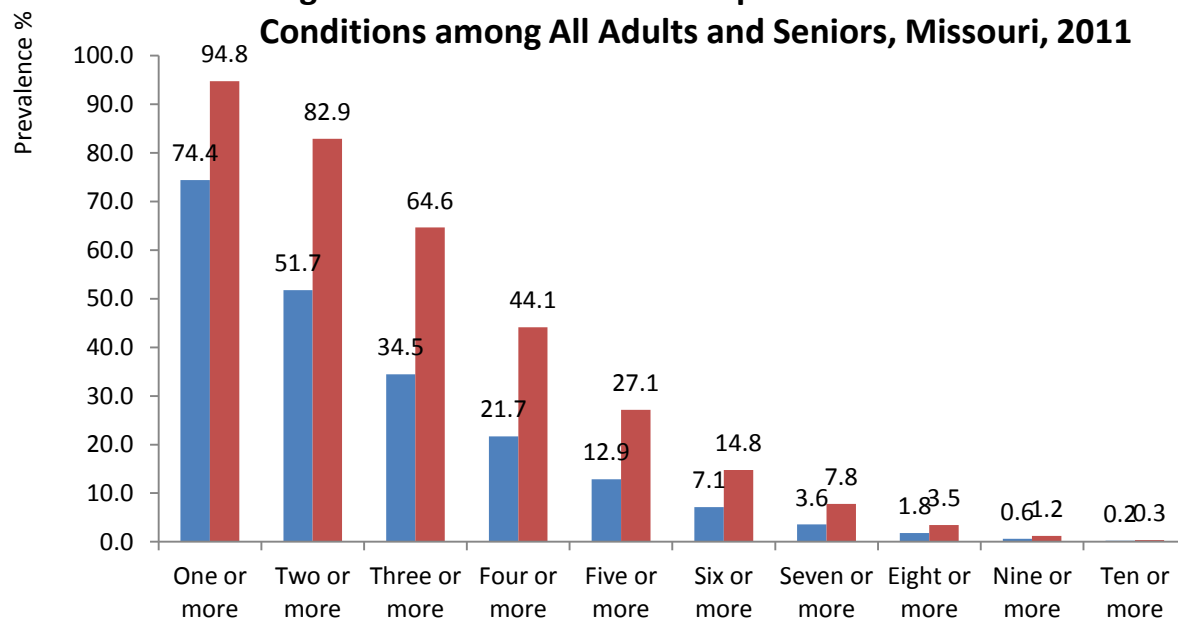


Figure 37: Prevalence of Multiple Chronic Diseases and Conditions among All Adults and Seniors, Missouri, 2011



Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

The figure 36 shows the prevalence of 13 chronic diseases or conditions among Missouri adults and seniors. Many adults have multiple chronic diseases. About three out of every four Missouri adults had at least one of the 13 chronic diseases or conditions, more than one in two had at least two, and more than one in three had at least three of those diseases or conditions (Figure 37). Among seniors, the prevalence was even higher. About 95 percent of seniors had at least one of these chronic diseases or conditions, more than 80 percent had at least two, and about 65 percent had at least three.

Part Two: Cancer Incidence, Mortality, Screening, and Survivorship

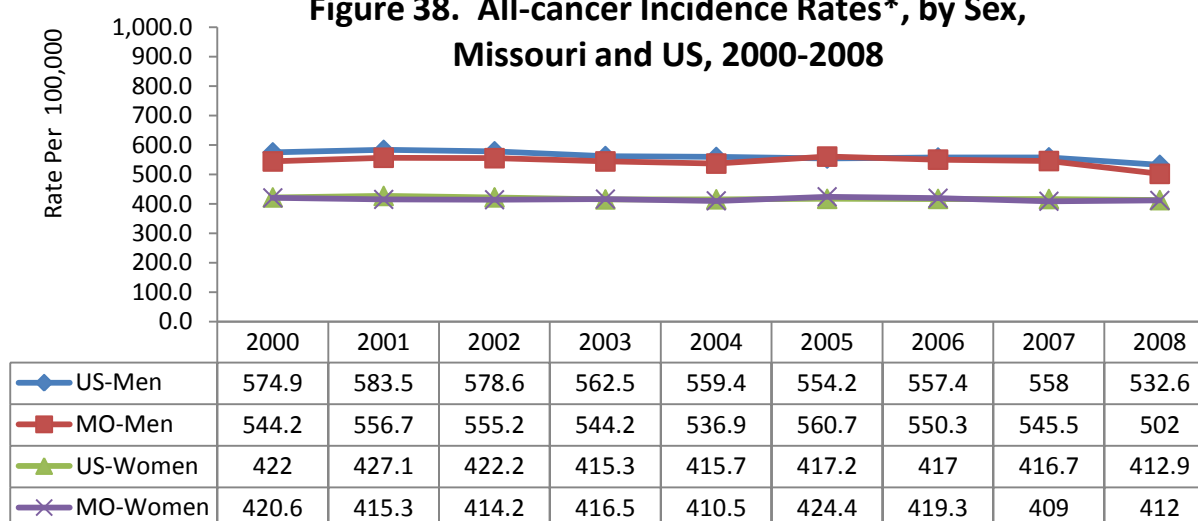
Chapter V: Cancer

Cancer is very common. It affects three out of four Missouri families. Cancer is the leading cause of death for individuals younger than 80 years of age and leading cause of premature death. In the US in 2010, cancer cost more than \$260 billion, including more than \$100 billion for direct medical costs.⁷ Cancer screening is very important. It has contributed to the decline in breast, cervical, and colorectal cancer mortality, and the primary prevention of colorectal and cervical cancers. This chapter covers incidence, mortality, cancer screening, and cancer survivor prevalence data for some of the major cancers.

⁷ American Cancer Society. Cancer Facts & Figures. Available from:
<http://www.cancer.org/research/cancerfactsstatistics/index>

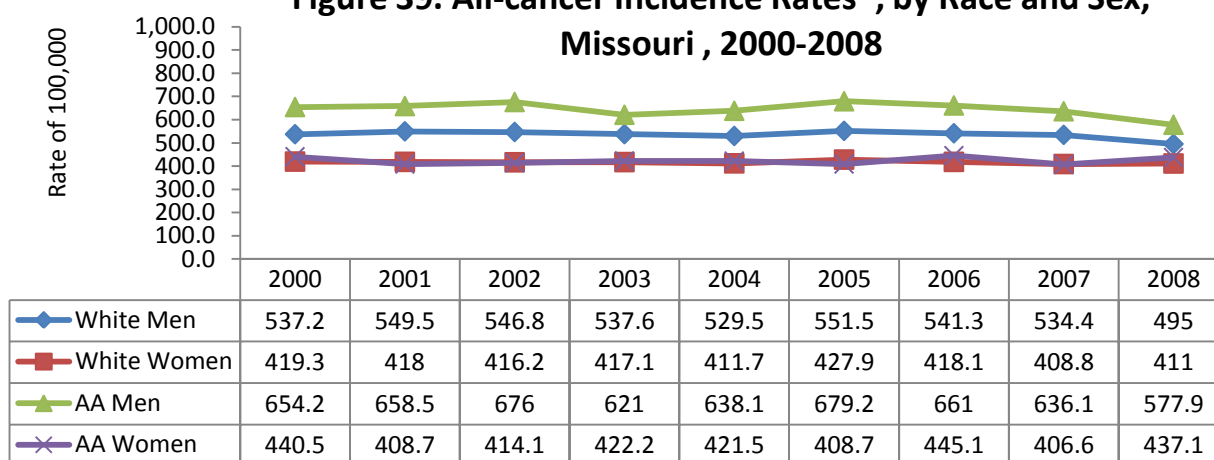
All-Cancer Incidence Rate

Figure 38. All-cancer Incidence Rates*, by Sex, Missouri and US, 2000-2008



There was a significant downward trend in all-cancer incidence rates for US men and women. Although the trend was not significant for Missouri men and women, the rates in 2008 were significantly lower than that in 2000 (Figure 38).

Figure 39. All-cancer Incidence Rates*, by Race and Sex, Missouri, 2000-2008



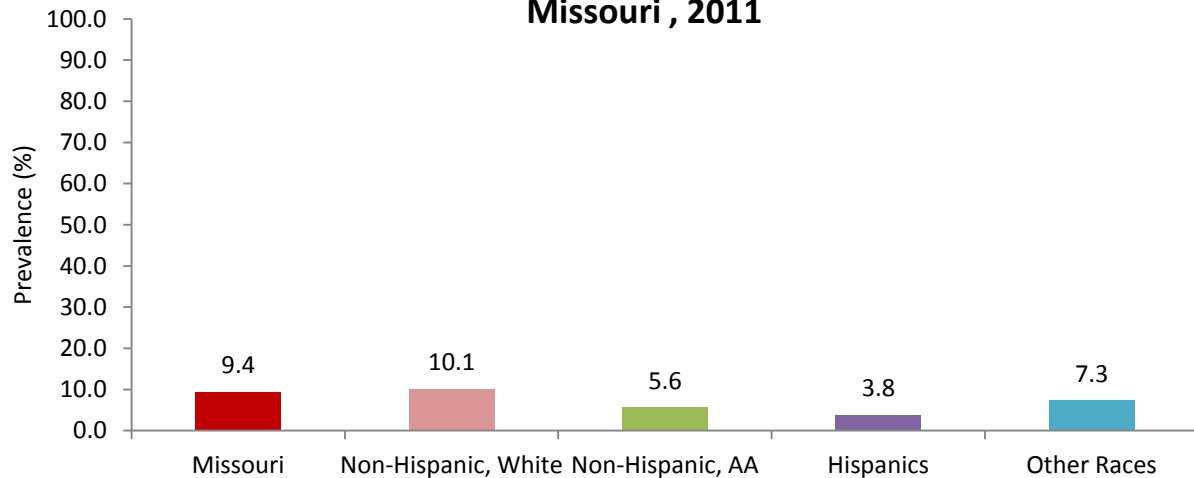
There was no significant trend for any racial and gender group. The cancer incidence rate declined significantly between 2000 and 2008 among white men, but not among other groups. The rate among African-American men was significantly higher than among white men (Figure 39).

*Age-adjusted using 2000 US standard population

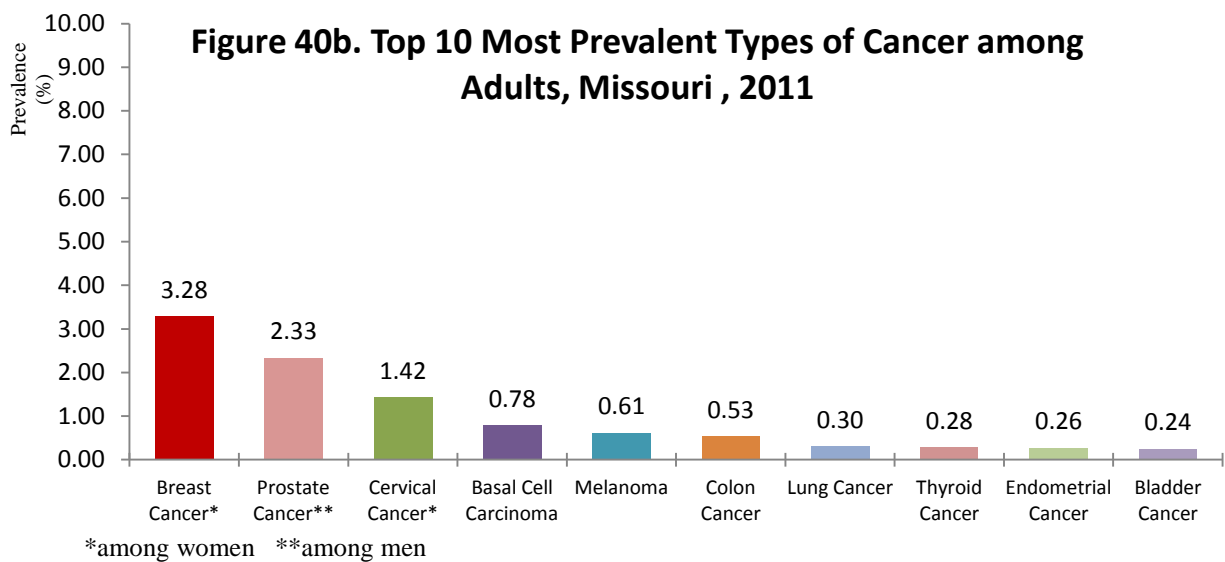
Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

Prevalence of Cancer Survivor

Figure 40a. Prevalence of Cancer Survivors, by Race/Ethnicity, Missouri, 2011



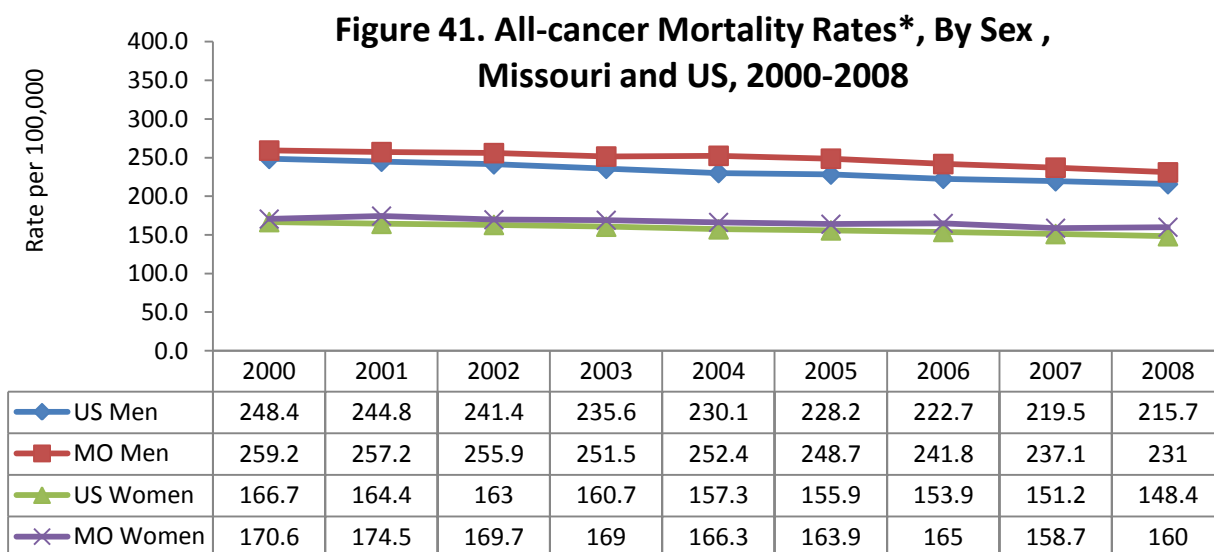
About 9.4 percent of Missouri adults were cancer survivors in 2011. The percentage was significantly higher among non-Hispanic whites than among non-Hispanic African Americans and Hispanics (Figure 40a).



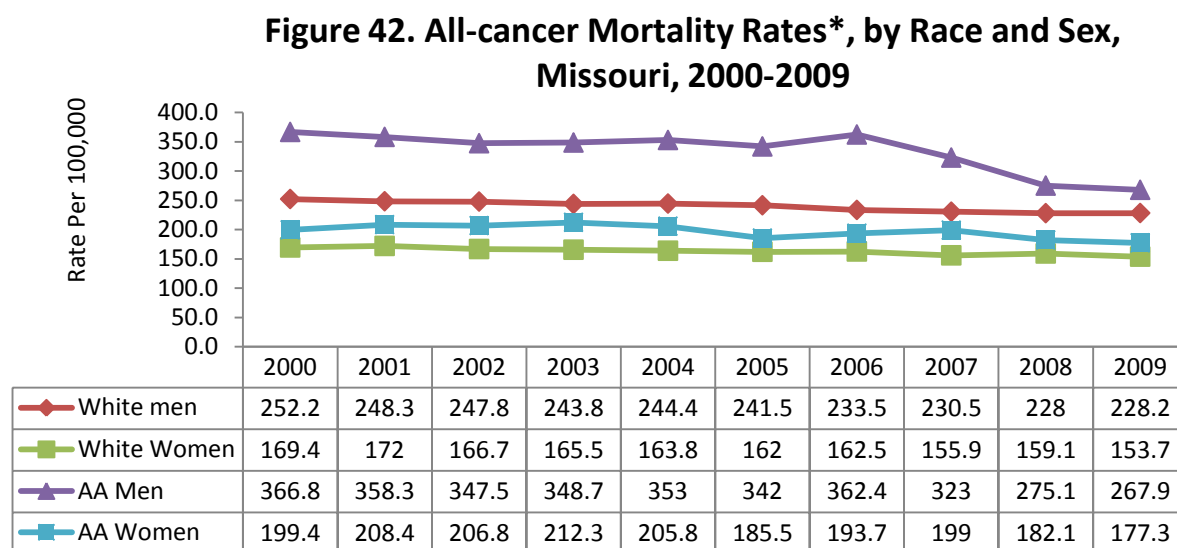
In 2011, breast cancer was the most prevalent type of cancer among women and prostate cancer was the most prevalent type of cancer among men (Figure 40b).

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

All-Cancer Mortality Rate



There was a significant downward trend in all-cancer mortality rates for men and women in Missouri and US. Missouri rates were significantly higher than the US rates (Figure 41).



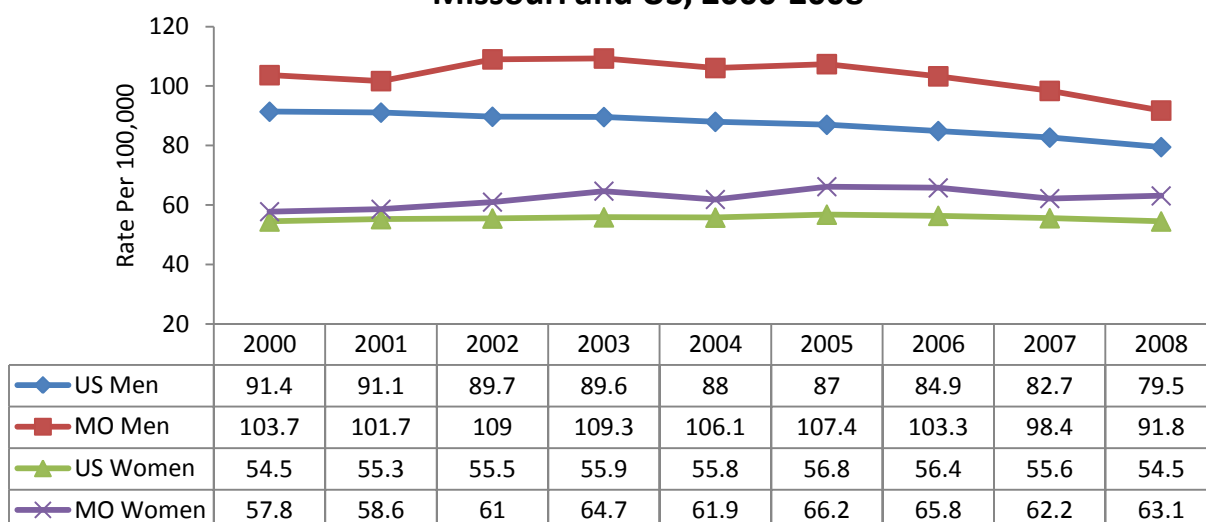
The downward trend in all-cancer mortality rates was significant for African-American and white men and women. The disparity between African-American men and white men has decreased (Figure 42).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

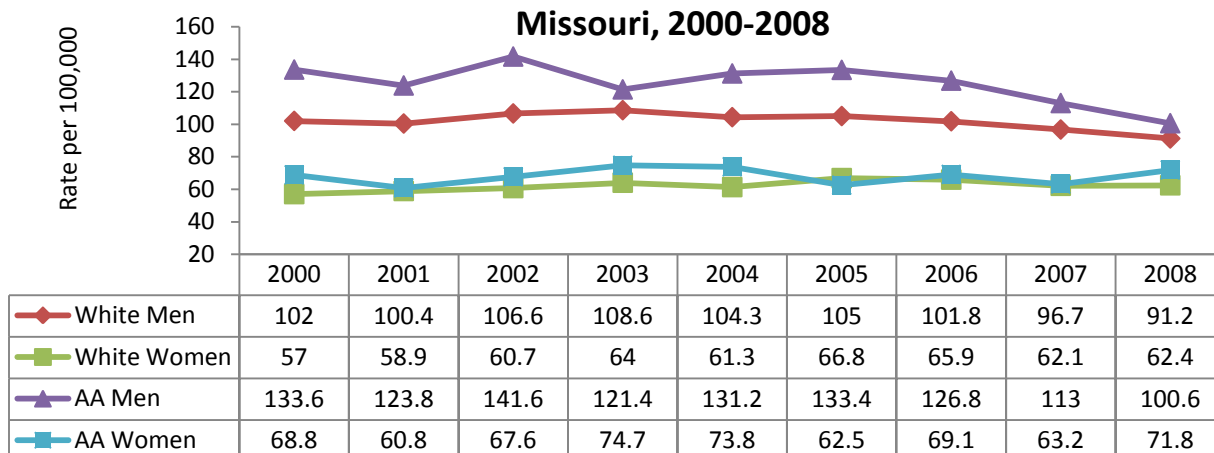
Lung Cancer Incidence Rate

Figure 43. Lung Cancer Incidence Rates*, by Sex, Missouri and US, 2000-2008



There was a significant downward trend for US men and women, and Missouri men. Missouri men and women had higher rates than US men and women (Figure 43).

Figure 44. Lung Cancer Incidence Rates*, by Race and Sex, Missouri, 2000-2008



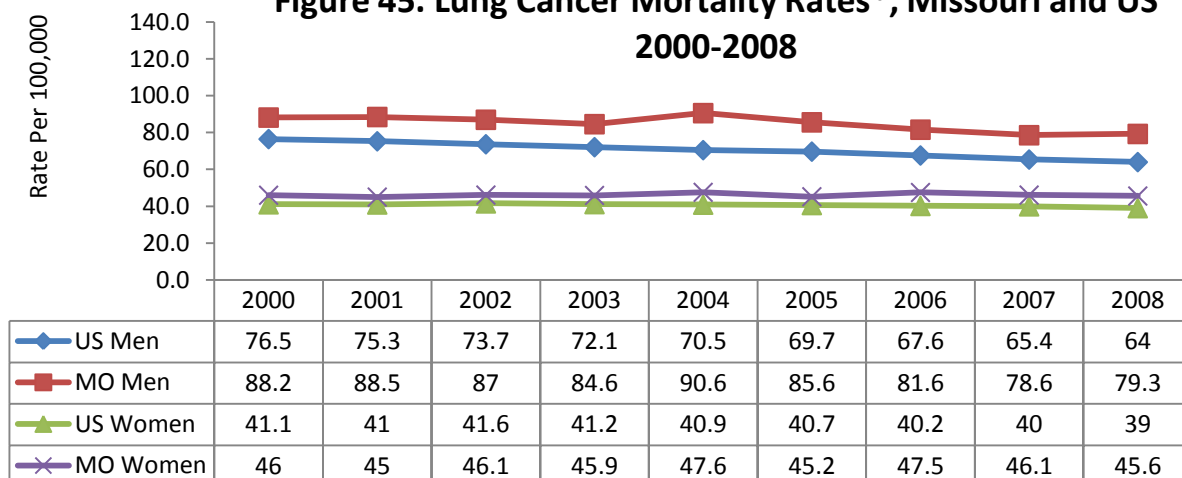
There was a significant downward trend among African-American men. The rate for African-American men was significantly higher than for white men. However, the disparity has decreased, primarily because of the decline in incidence among African-American men (figure 44).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

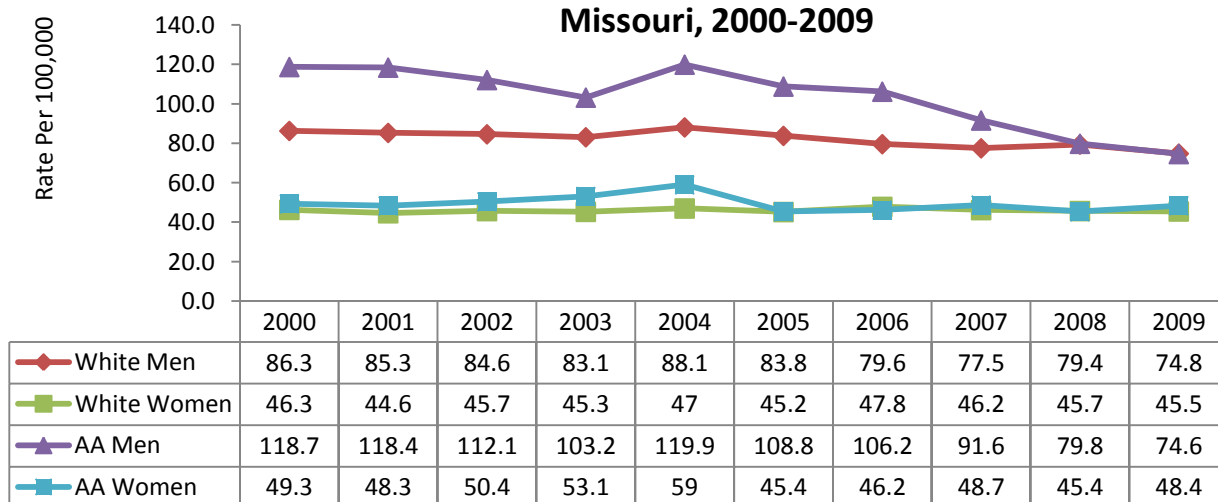
Lung Cancer Mortality Rate

Figure 45. Lung Cancer Mortality Rates*, Missouri and US 2000-2008



Missouri's lung cancer mortality rates were higher than the US rates for both men and women. The rates for US and Missouri men and US women have been declining in the last decade. However, the rates for Missouri women did not change significantly (Figure 45).

Figure 46. Lung Cancer Mortality Rates*, by Race and Sex, Missouri, 2000-2009



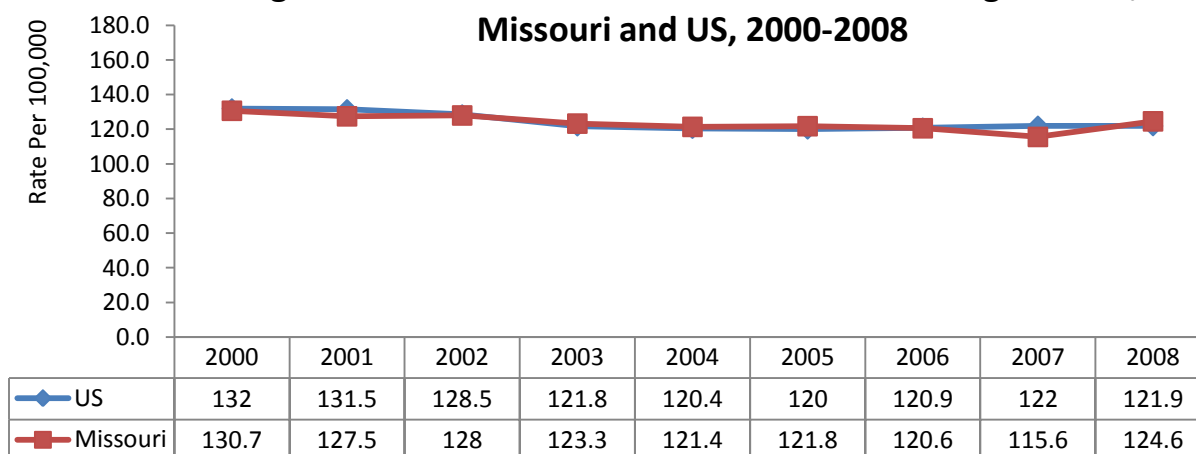
There was significant downward trend in lung cancer mortality rates for both white and African-American men. The disparity between African-American men and white men decreased in the last decade (Figure 46).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

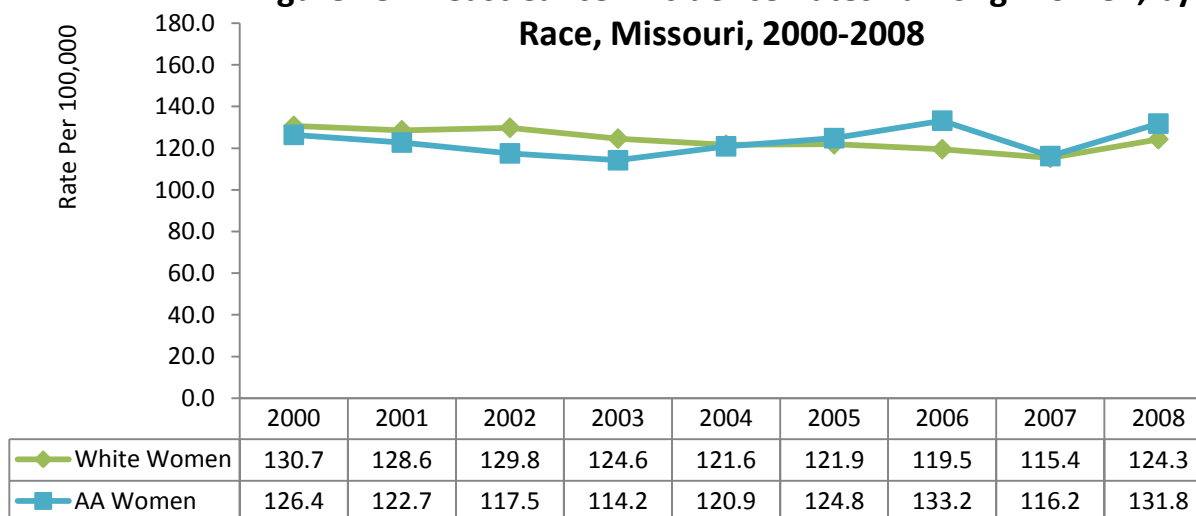
Breast Cancer Incidence Rate

Figure 47. Breast Cancer Incidence Rates* among Women, Missouri and US, 2000-2008



Aside from non-melanoma skin cancer, breast cancer is the most common form of cancer in American women of all races and ethnicities. Incidence rates in Missouri were similar to that in the US (Figure 47).

Figure 48. Breast Cancer Incidence Rates* among Women, by Race, Missouri, 2000-2008



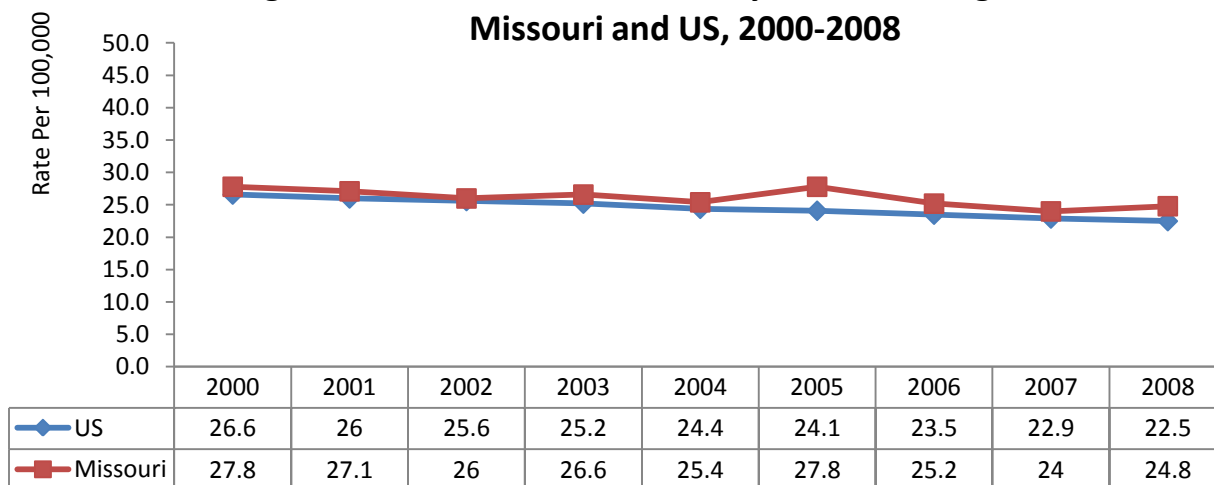
African-American women had lower incidence rates than white women through 2004. However, incidence rates have been higher in African-American women since 2005 (Figure 48).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

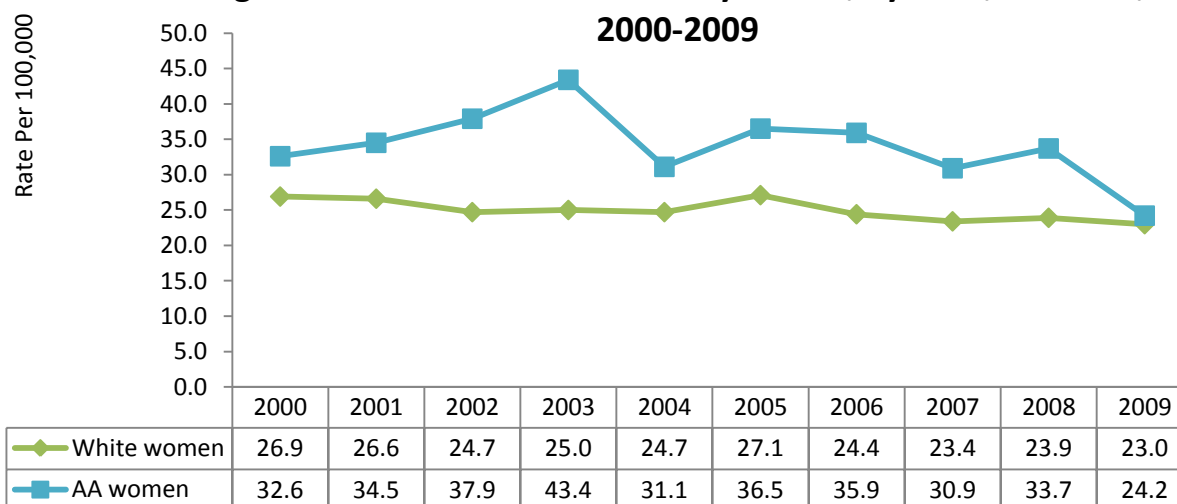
Breast Cancer Mortality Rate

Figure 49. Breast Cancer Mortality Rates* among Women, Missouri and US, 2000-2008



There was a significant downward trend in breast cancer mortality rates in both the US and Missouri. Rates in Missouri were higher than that in the US each year (Figure 49).

Figure 50. Breast Cancer Mortality Rates*, by Race, Missouri, 2000-2009



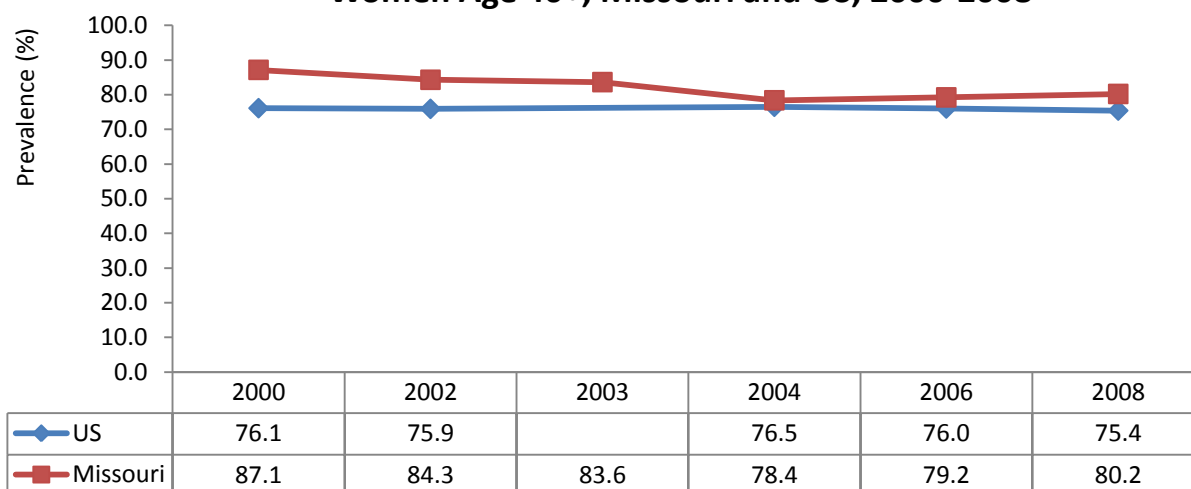
African-American women had higher mortality rates than white women for breast cancer each year. There was a significant downward trend for white women. The rates fluctuated from year to year among African-American women. Overall, the racial disparity decreased (Figure 50).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

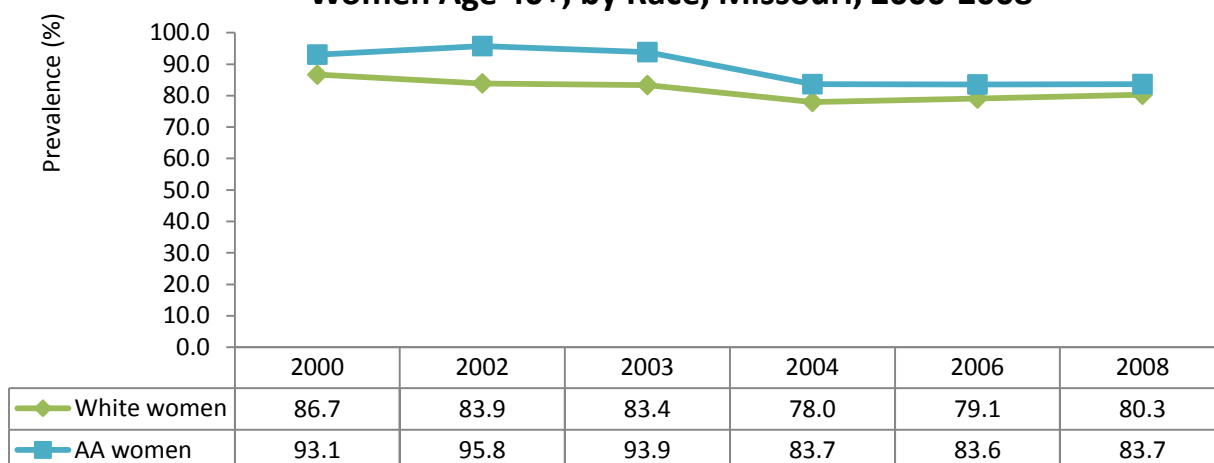
Prevalence of Breast Cancer Screening

Figure 51. Had Mammogram Within the Past Two Years among Women Age 40+, Missouri and US, 2000-2008



Breast cancer screening can help identify cancer at an early and treatable stage. Prevalence of having had a mammogram within the last two years among women age 40 or older was higher in Missouri than in the US, but the difference is decreasing (Figure 51).

Figure 52. Had Mammogram Within the Past Two Years among Women Age 40+, by Race, Missouri, 2000-2008

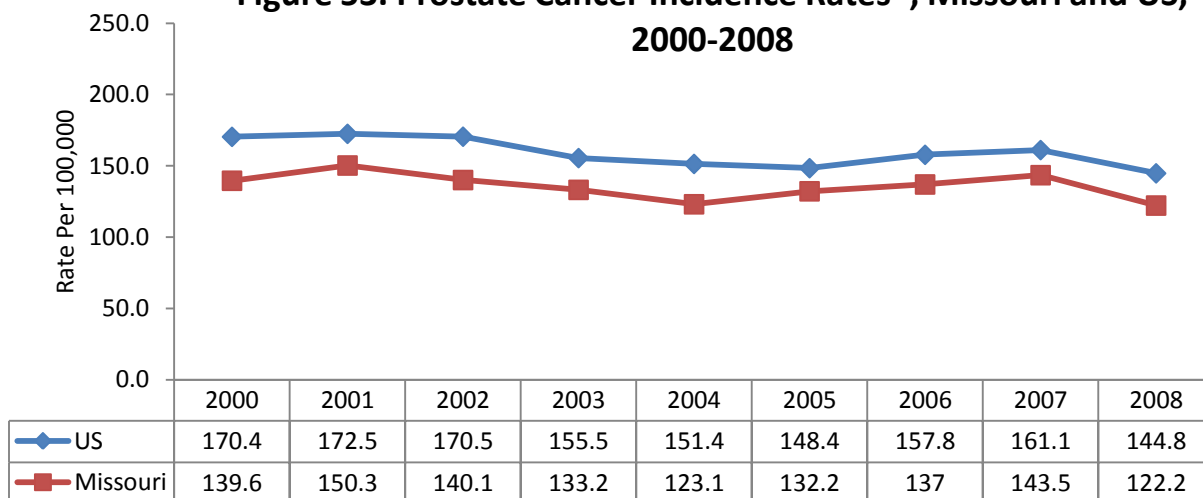


The prevalence of having had a mammogram within the past two years among women age 40 or older was higher among African-American women than among white women, but the difference in rates is also decreasing (Figure 52).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

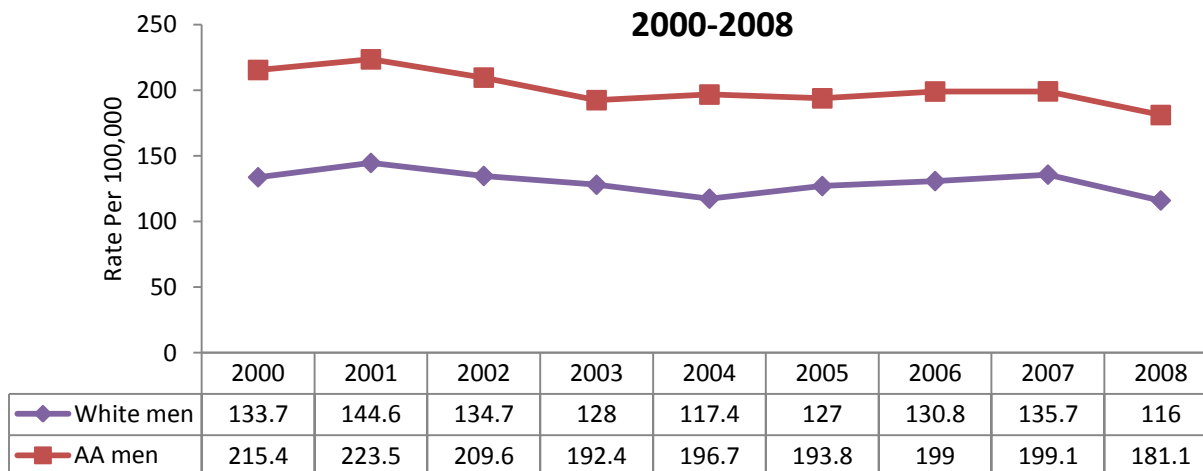
Prostate Cancer Incidence Rate

Figure 53. Prostate Cancer Incidence Rates*, Missouri and US, 2000-2008



Prostate cancer is the most common cancer in men. There was a significant downward trend in the prostate cancer incidence rates in the US, but not in Missouri. Missouri's rates were lower than the US rates each year (Figure 53).

Figure 54. Prostate Cancer Incidence Rates*, by Race, Missouri, 2000-2008



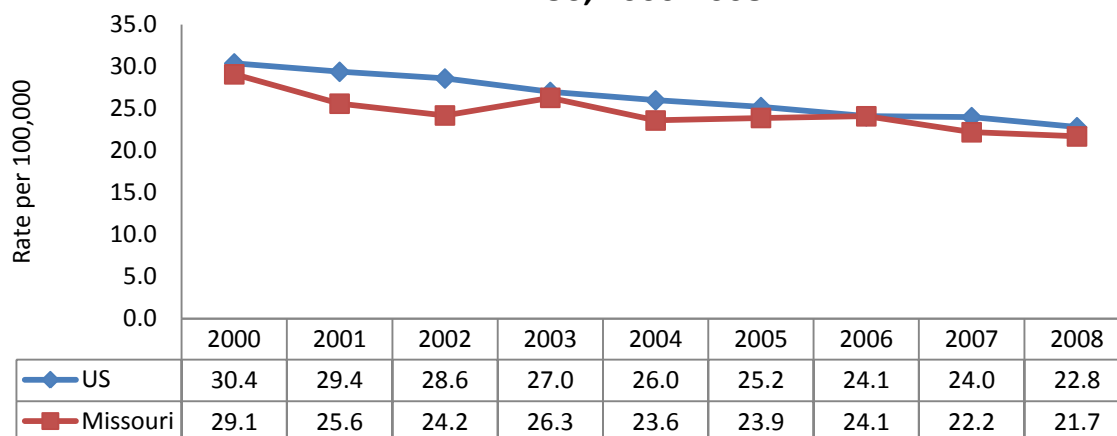
In Missouri, African-American men had significantly higher prostate cancer incidence rates each year than white men (Figure 54).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

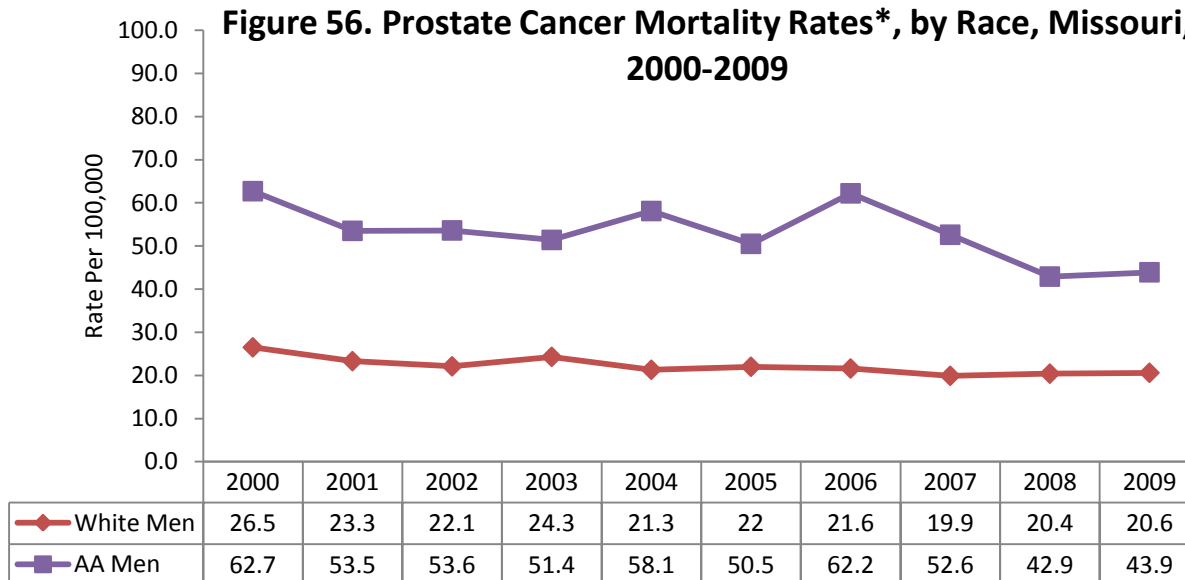
Prostate Cancer Mortality Rate

Figure 55. Prostate Cancer Mortality Rates*, Missouri and US, 2000-2008



There were significant downward trends in prostate cancer mortality rates in both US and Missouri. Missouri's rates were lower than the US rates each year (Figure 55).

Figure 56. Prostate Cancer Mortality Rates*, by Race, Missouri, 2000-2009



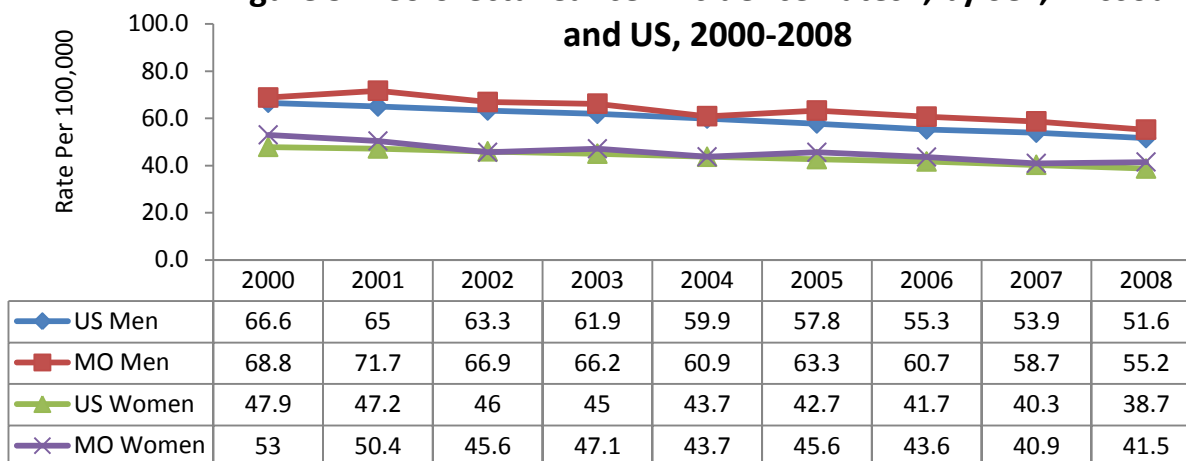
The prostate cancer mortality rates were significantly higher (more than doubled) among African-American men than among white men in Missouri during the last ten years. There was a significant downward trend in prostate cancer mortality rates among white men only (Figure 56).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

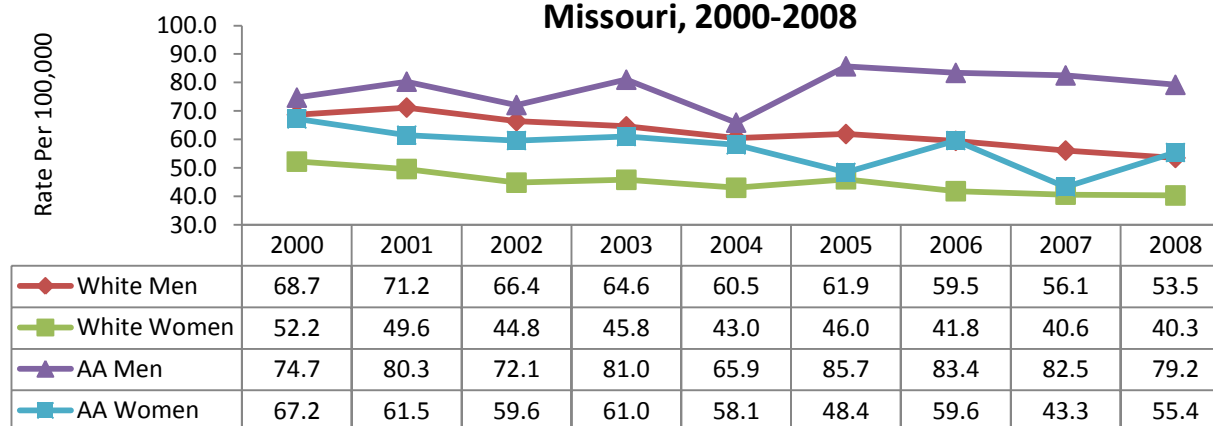
Colorectal Cancer Incidence Rate

Figure 57. Colorectal Cancer Incidence Rates*, by Sex, Missouri and US, 2000-2008



Of cancers affecting both men and women, colorectal cancer (cancer of the colon and rectum) is the second leading cancer killer in the United States. Screening can find precancerous polyps that can be removed before becoming cancerous. There was a significant downward trend in the US and Missouri. Among both women and men, Missouri's rates were higher than the US rates (Figure 57).

Figure 58. Colorectal Cancer Incidence Rates*, by Race and Sex, Missouri, 2000-2008



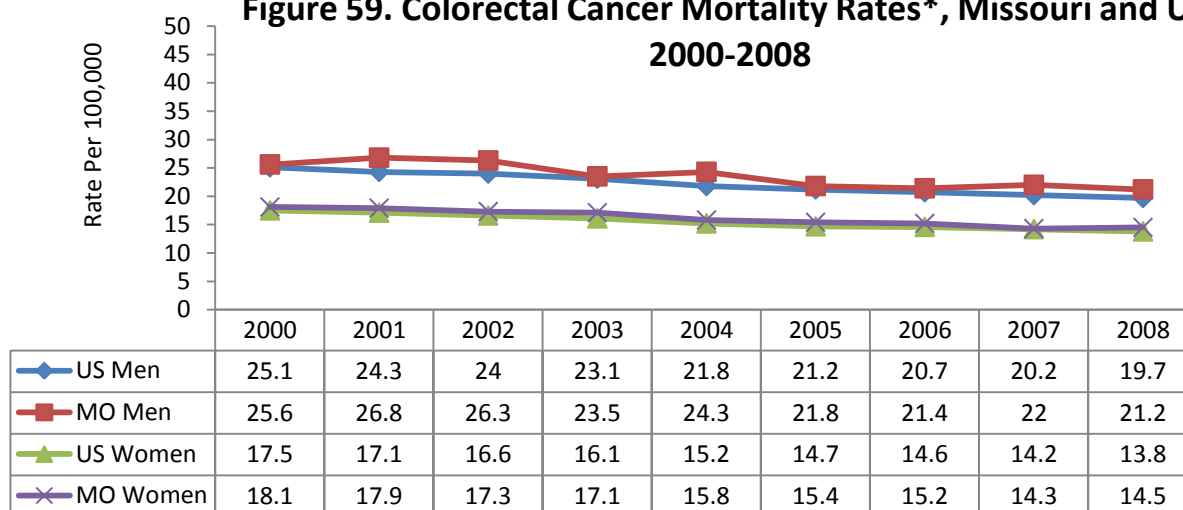
There was a significant downward trend for white men and women, and African-American women. The disparity between African-American men and white men increased in the last decade (Figure 58).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

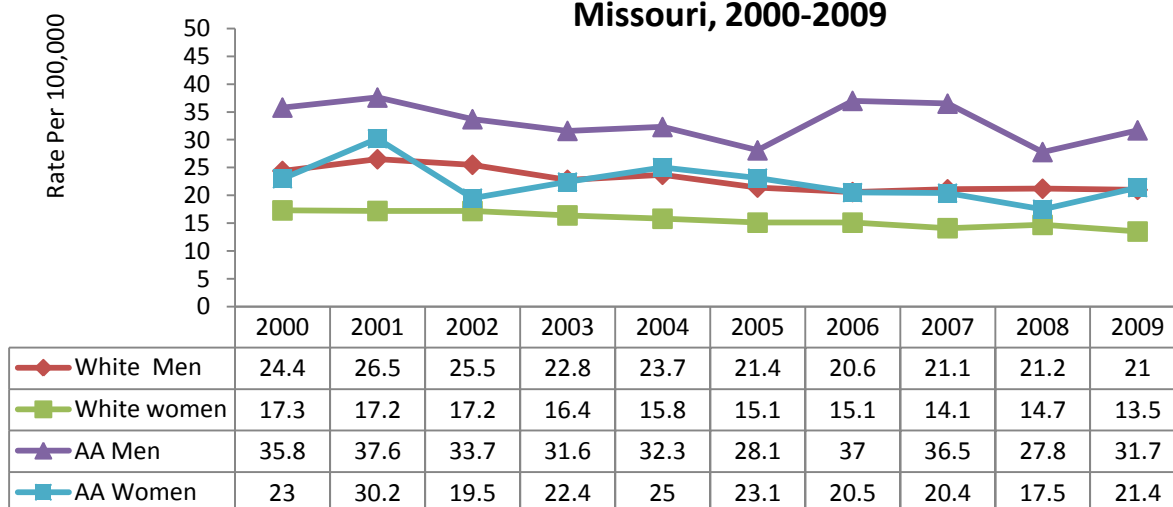
Colorectal Cancer Mortality Rate

Figure 59. Colorectal Cancer Mortality Rates*, Missouri and US, 2000-2008



There was a significant downward trend in colorectal cancer mortality rates in men and women in both the US and Missouri. Missouri men and women had higher rates than US men and women (Figure 59).

Figure 60. Colorectal Cancer Mortality Rates*, by Race and Sex, Missouri, 2000-2009



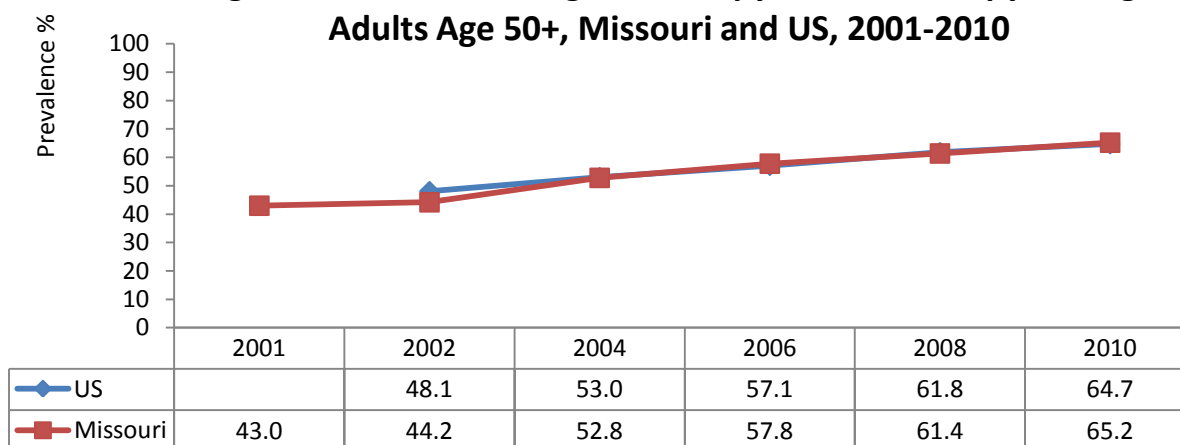
There was a significant downward trend in the colorectal cancer mortality rates for white men and women. Racial disparities still exist for both men and women (Figure 60).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

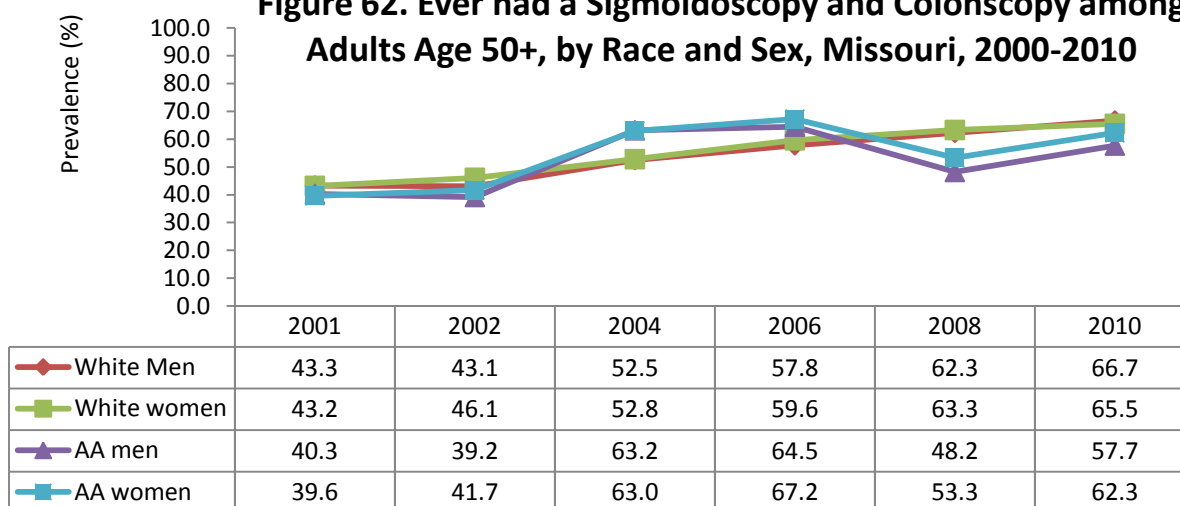
Prevalence of Colorectal Cancer Screening

Figure 61. Ever had a Sigmoidoscopy and Colonoscopy among Adults Age 50+, Missouri and US, 2001-2010



There was a significant upward trend in ever having had a sigmoidoscopy and colonoscopy among adults aged 50 or older in both US and Missouri. Missouri's prevalence is similar to the US (Figure 61).

Figure 62. Ever had a Sigmoidoscopy and Colonoscopy among Adults Age 50+, by Race and Sex, Missouri, 2000-2010

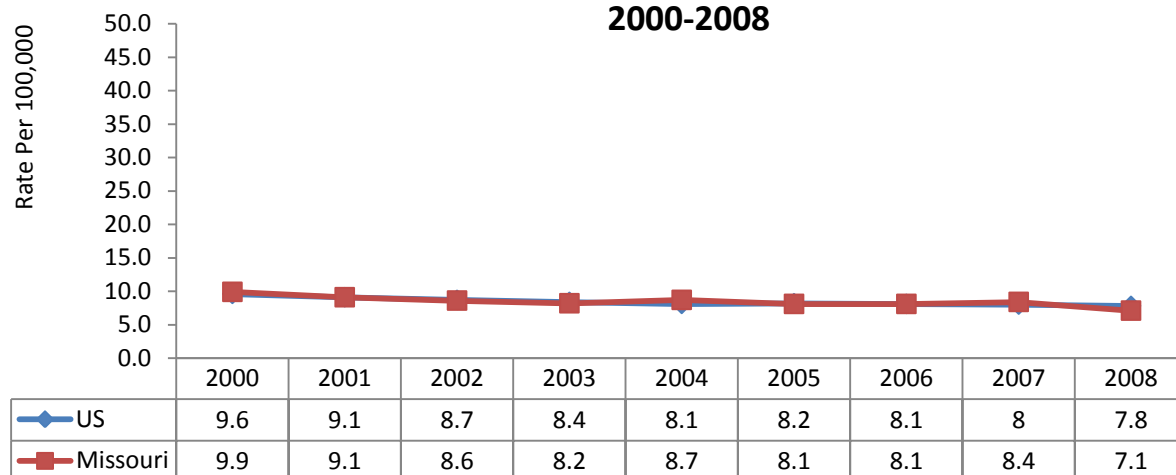


The upward trend was significant for white men and women. The prevalence for African-American women and men increased from 2001 to 2010, but not statistically significant because of the small sample size of African Americans in the BRFSS survey (Figure 62).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Cervical Cancer Incidence Rate

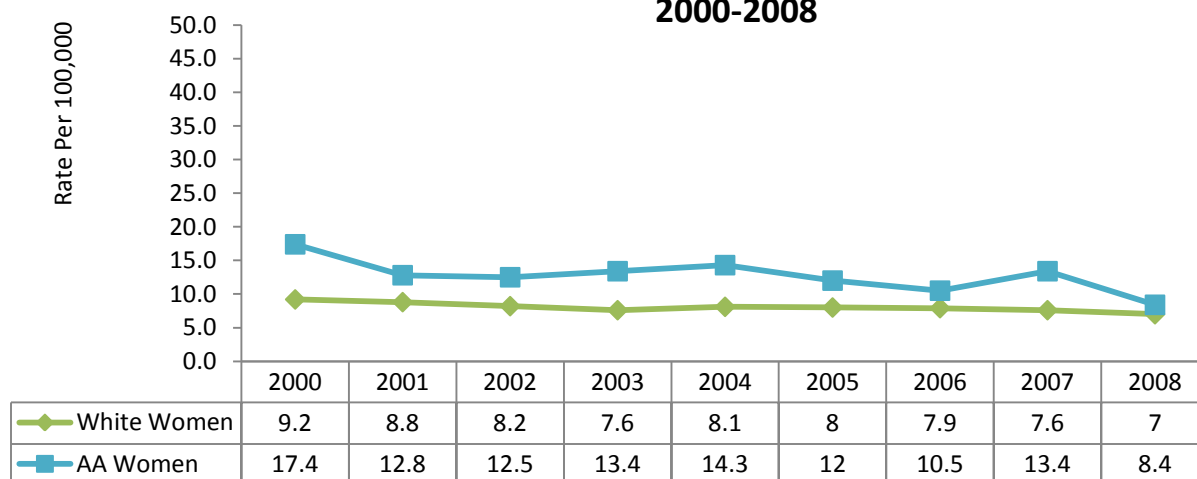
Figure 63. Cervical Cancer Incidence Rates*, Missouri and US, 2000-2008



There were significant downward trends in cervical cancer incidence rates in both US and Missouri. Missouri's rates were similar to the US rates (Figure 63).

There was a significant downward trend in cervical cancer incidence rates among both white and

Figure 64. Cervical Cancer Incidence Rates*, by Race, Missouri, 2000-2008



African-American women. African-American women had higher rates than white women.

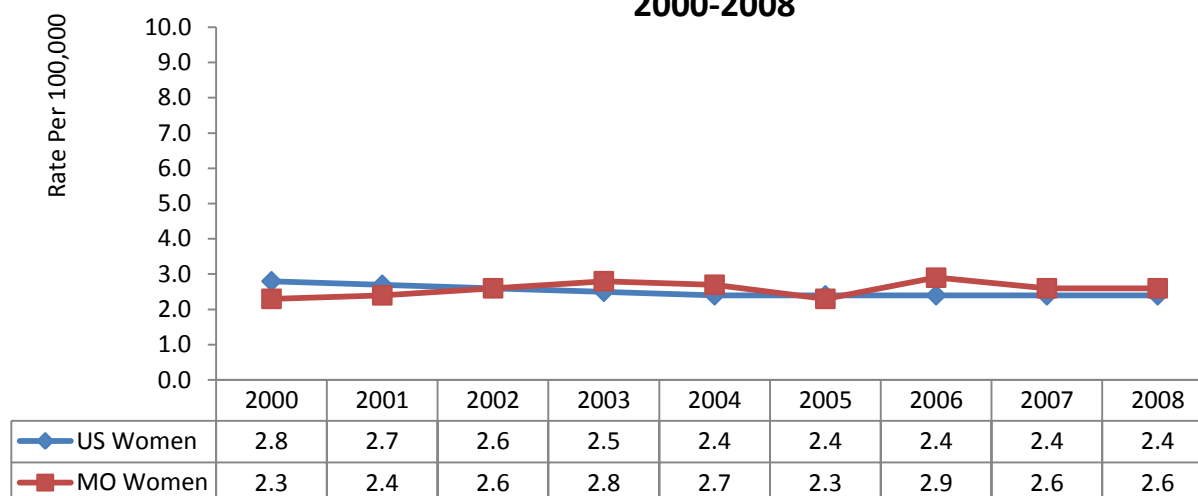
However, the racial disparity decreased during this period (Figure 64).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

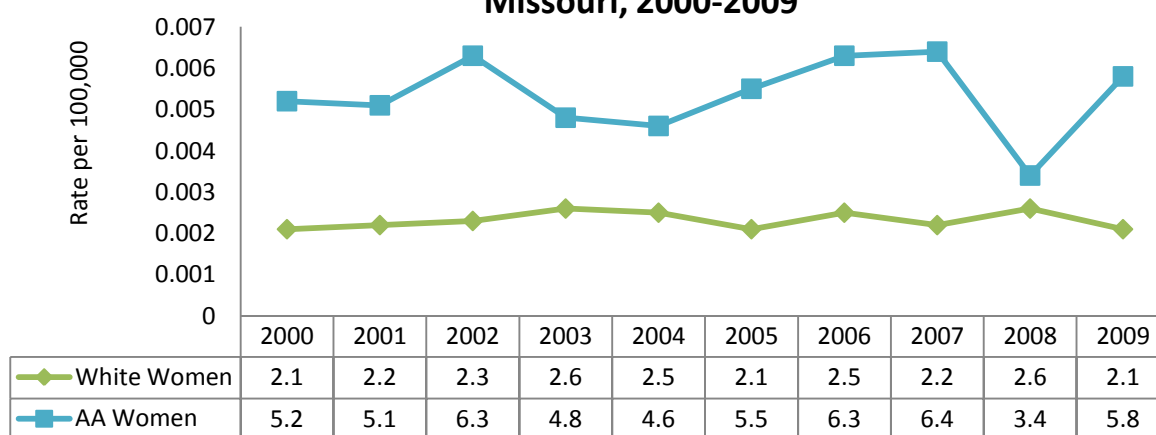
Cervical Cancer Mortality Rate

Figure 65. Cervical Cancer Mortality Rates*, Missouri and US, 2000-2008



There was a significant downward trend in cervical cancer mortality in the US. Missouri's rates were similar to the US rates (Figure 65).

Figure 66. Cervical Cancer Mortality Rates*, by Race, Missouri, 2000-2009



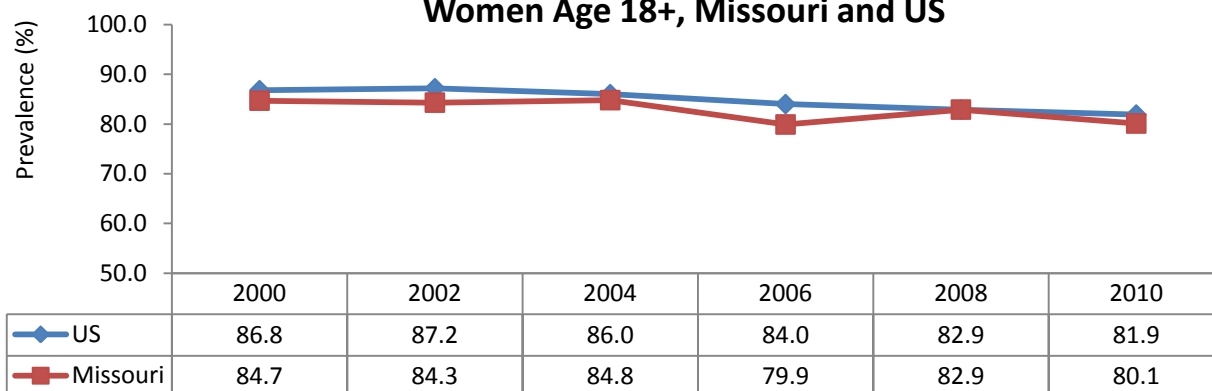
The cervical mortality rates were significantly higher among African-American women than among white women (Figure 66).

*Age-adjusted using 2000 US standard population

Source: Missouri Information for Community Assessment, Missouri Department of Health and Senior Services and CDC WONDER

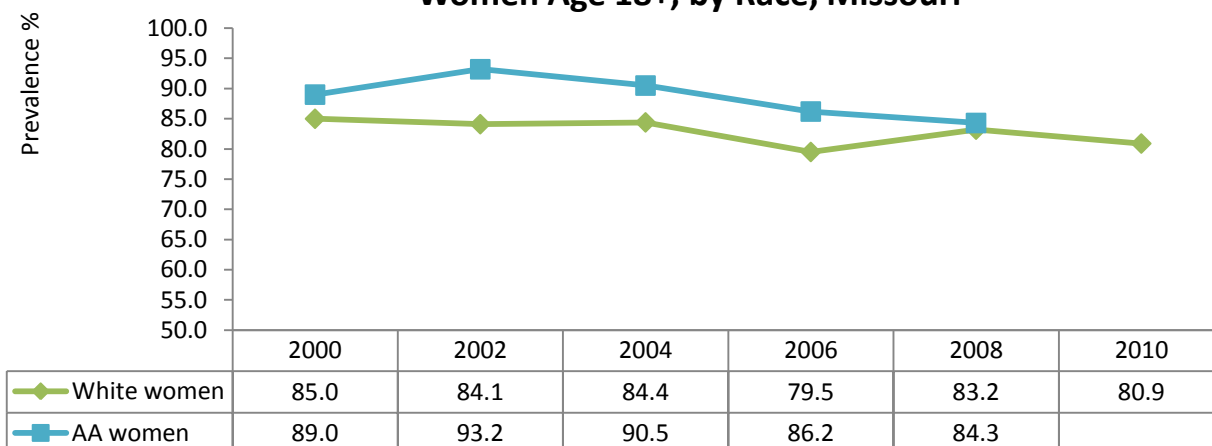
Prevalence of Cervical Cancer Screening

Figure 67. Had a Pap Test Within the Past 3 Years among Women Age 18+, Missouri and US



The prevalence of having had a Pap test within the past 3 years among women age 18 or older has been trending down in the last decade in the US. The prevalence is also decreasing in Missouri, although it is not statistically significant. Missouri's prevalence was slightly lower than that in the US (Figure 67).

Figure 68. Had a Pap Test Within the Past 3 Years among Women Age 18+, by Race, Missouri



The prevalence of having had a Pap test within the past 3 years among women age 18 or older was higher among African-American women; however, it has been declining among African-American women (Figure 68).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

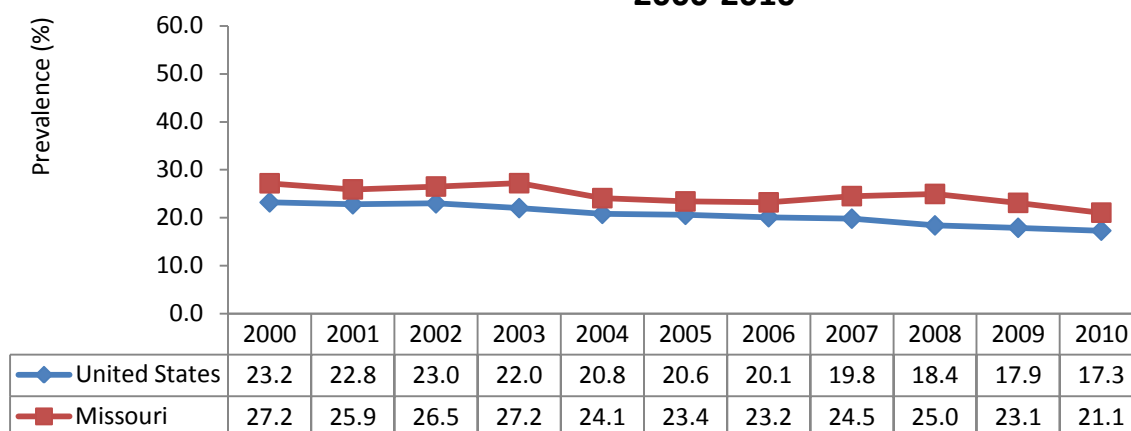
Part Three: Risk Factors for Chronic Diseases and Complications

Chapter VI: Risk Behaviors

Modifiable behavioral risk factors, such as tobacco use, poor diet, and physical inactivity, can lead to chronic diseases. In the United States, tobacco use is the number one actual cause of death, followed by poor diet, physical inactivity, and alcohol consumption.

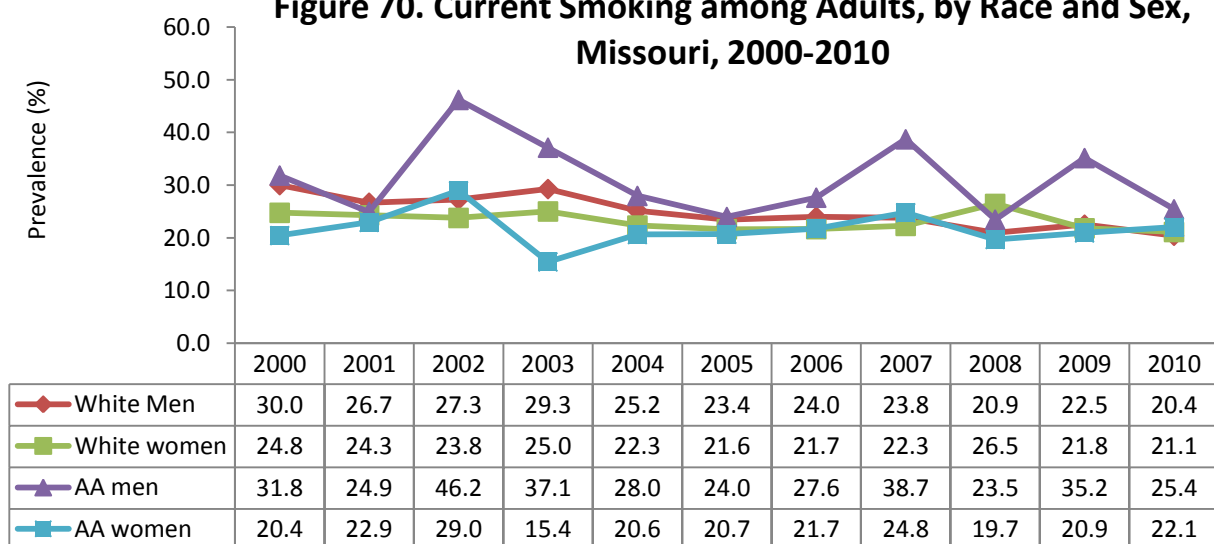
Tobacco Use among Adults

Figure 69. Current Smoking among Adults, Missouri and US, 2000-2010



In the last decade, the smoking prevalence among adults has been trending down in both Missouri and the US. However, the prevalence in Missouri has been consistently higher than the US (Figure 69).

Figure 70. Current Smoking among Adults, by Race and Sex, Missouri, 2000-2010

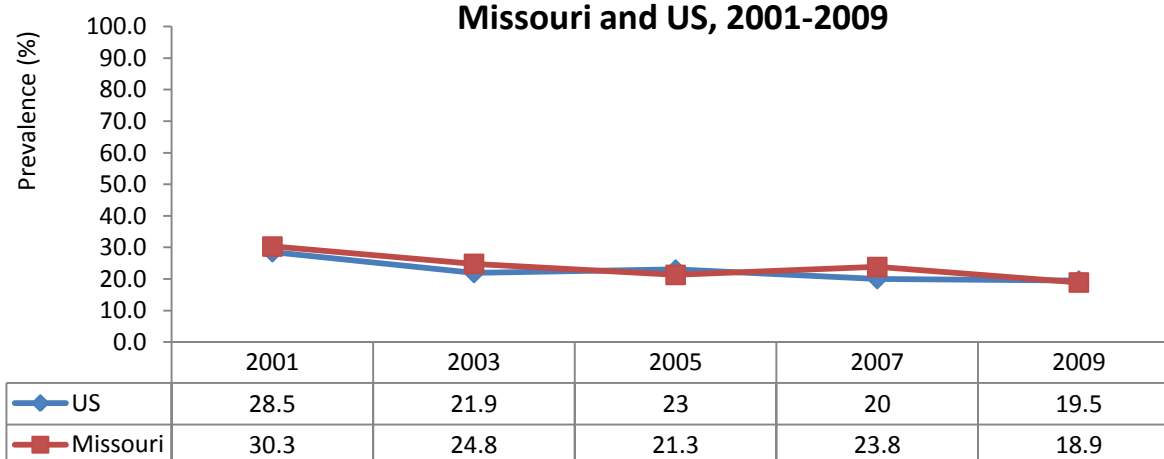


The downward trend in the current smoking prevalence was significant for white men in Missouri, but not for other racial and gender groups. African-American men tended to have a higher current smoking prevalence than other groups (Figure 70).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

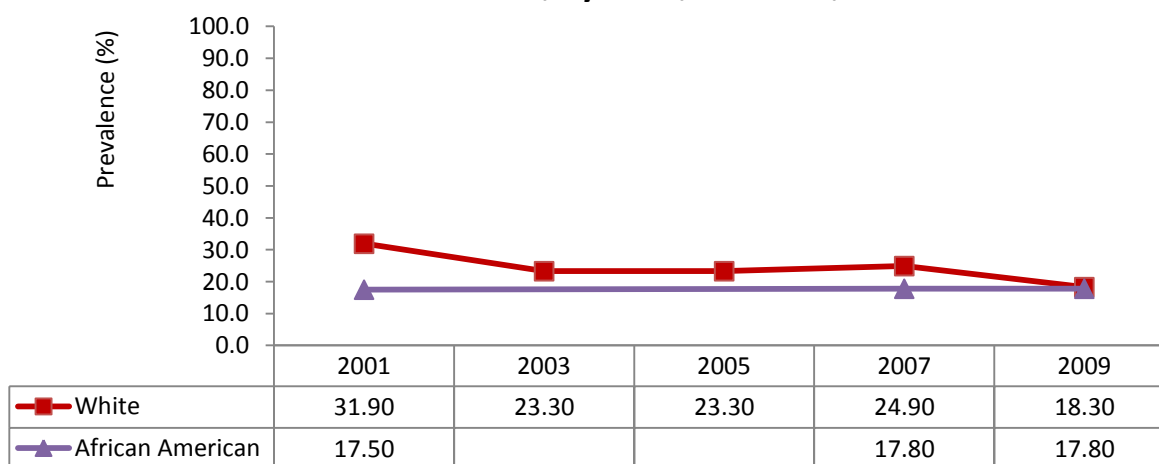
Tobacco Use among Youth

Figure 71. Current Smoking among High School Students, Missouri and US, 2001-2009



From 2001 to 2009, the smoking prevalence decreased significantly among high school students in both Missouri and the US (Figure 71).

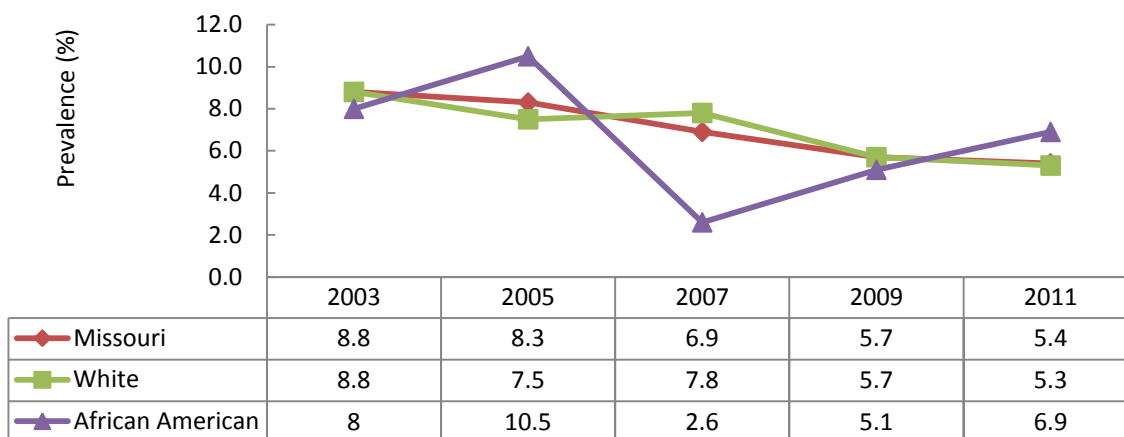
Figure 72. Prevalence of Current Smoking among High School Students, by Race, Missouri, 2001-2009



The smoking prevalence among white high school students has been higher than that among African-American students. However, the prevalence among white students decreased significantly from 2001 to 2009, and therefore, the racial disparity has decreased during this period (Figure 72).

Source: Youth Risk Behavior Survey, Centers for Disease Control and Prevention

Figure 73. Current Smoking among Middle School Students, by Race, Missouri, 2003-2011

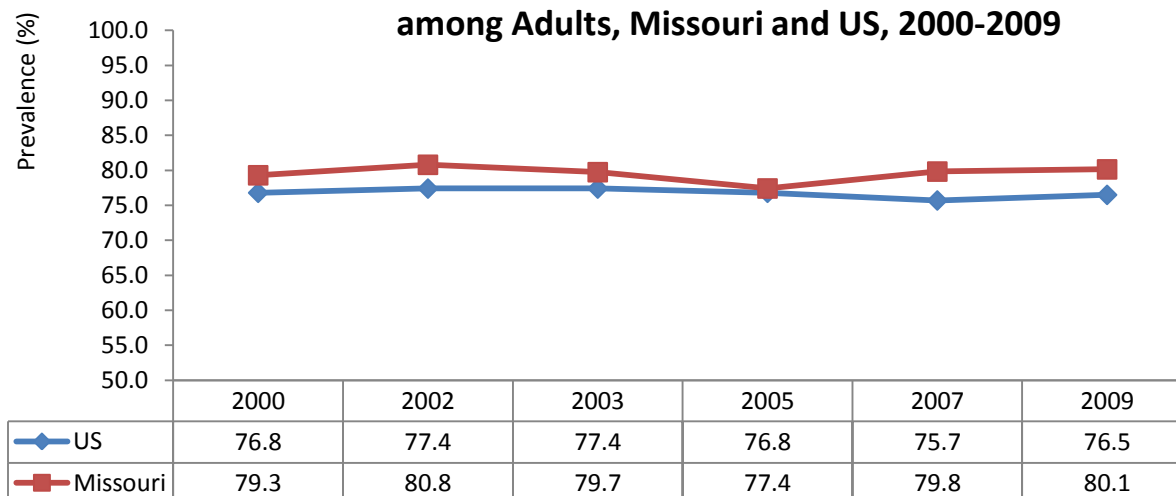


From 2003 to 2011, there was a significant downward trend in the current smoking prevalence among middle school students in Missouri. The trend was significant for white, but not for African-American students (Figure 73).

Source: Missouri Youth Tobacco Survey, Missouri Department of Health and Senior Services

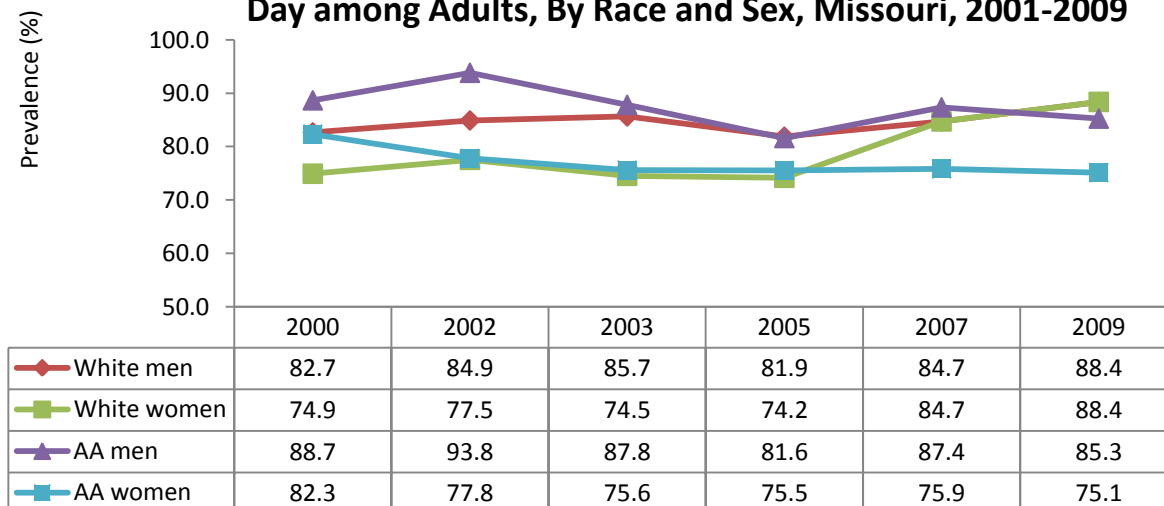
Unhealthy Diet among Adults

Figure 74. Fruit and Vegetable Intake Less than 5 Times Per Day among Adults, Missouri and US, 2000-2009



In Missouri, about 8 out of 10 adults consumed fruits and vegetables less than 5 times per day in the last decades. The prevalence of inadequate fruit and vegetable consumption has been consistently higher in Missouri than in the US (Figure 74).

Figure 75. Fruit and Vegetable Intake Less than 5 Times Per Day among Adults, By Race and Sex, Missouri, 2001-2009

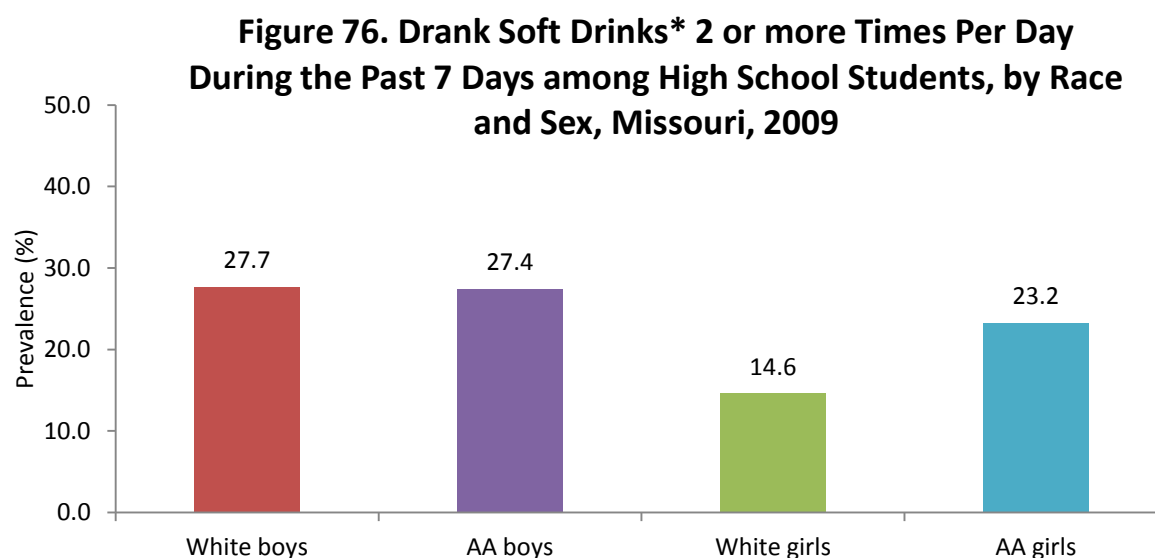


The prevalence of inadequate fruit and vegetable consumption tended to be higher among men than women in Missouri. The prevalence of inadequate consumption among white women increased about 10 percentage points from 2005 to 2007, and continued to increase in 2009 (Figure 75).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Unhealthy Diet among Youth

In 2009, 80.2% of high school students did not eat fruits or drink 100% fruit juices three or more times per day in Missouri, compared to 77.1% in the US. Similarly, about 85.3% of high school students did not consume vegetables three or more times per day in Missouri, compared to 86.2% in the US. In Missouri, the percentage of high school students who did not consume fruits or 100% fruit juices three or more times per day was significantly higher among white high school students (84.8%) than among African-American students (75.1%). There was no significant racial and gender difference in the consumption of vegetables three or more times per day among high school students.



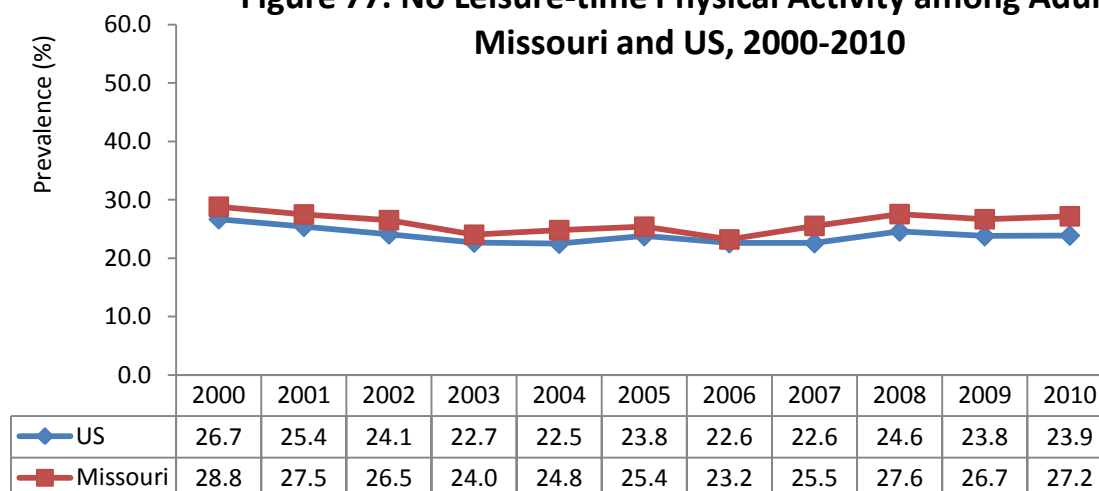
In 2009, 22.1% of high school students drank soft drinks two or more times per day during the past 7 days prior to the survey in Missouri, compared to 19.7% in the US. In Missouri, the prevalence was significantly higher among high school boys (27.7%) than girls (16.2%). Among girls, the prevalence was significantly higher among African-Americans than among whites (Figure 76).

*Soda or pop, not including diet soda or diet pop

Source: Youth Risk Behavior Survey, Centers for Disease Control and Prevention

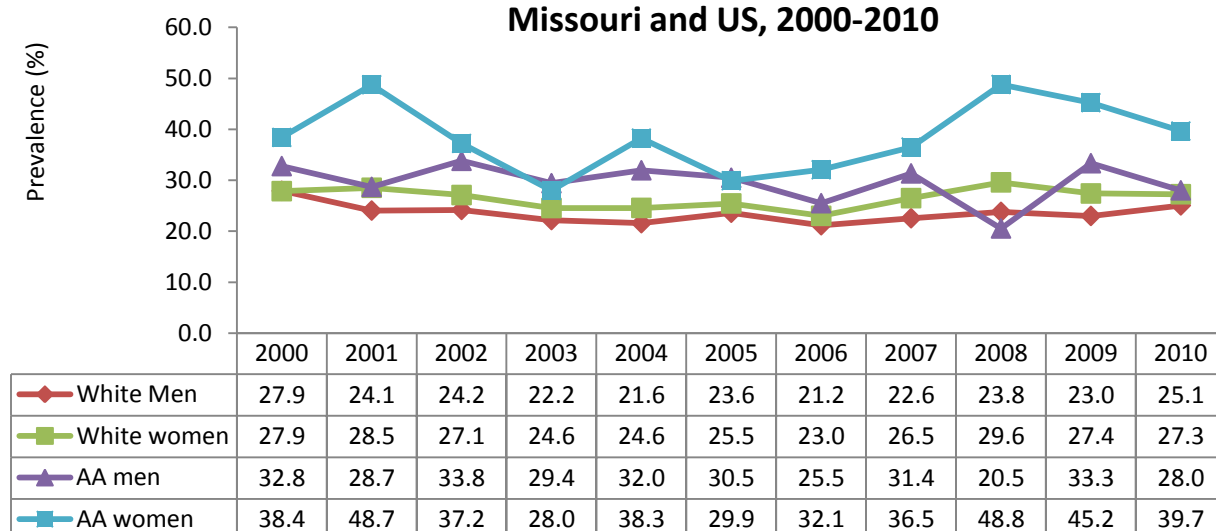
Physical Inactivity among Adults

Figure 77. No Leisure-time Physical Activity among Adults, Missouri and US, 2000-2010



About one in four Missouri adults did not engage in any leisure-time physical activity in the last decade. The prevalence of no leisure-time physical activity has been consistently higher in Missouri than in the US (Figure 77).

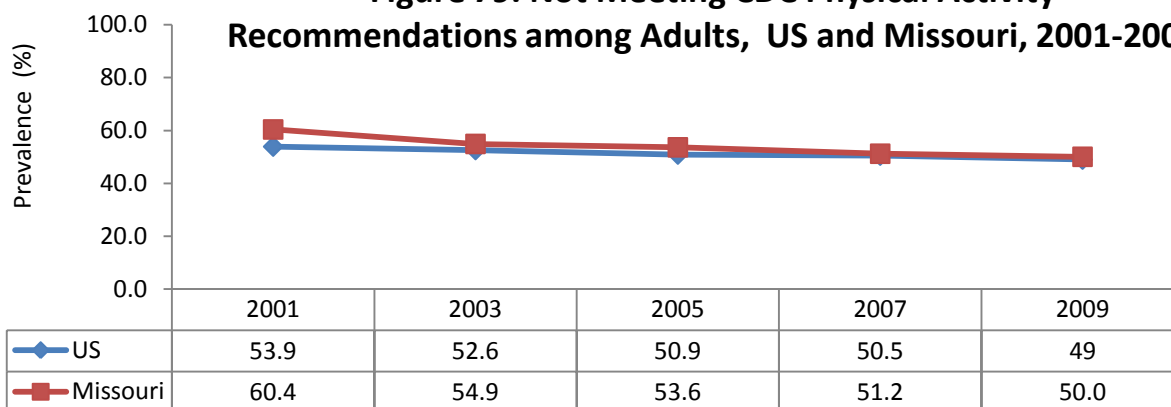
Figure 78. No Leisure-time Physical Activity among Adults, Missouri and US, 2000-2010



The prevalence of no leisure-time physical activity tended to be higher among African-American women than among other racial and gender groups. There was no significant trend in any racial and gender groups (Figure 78).

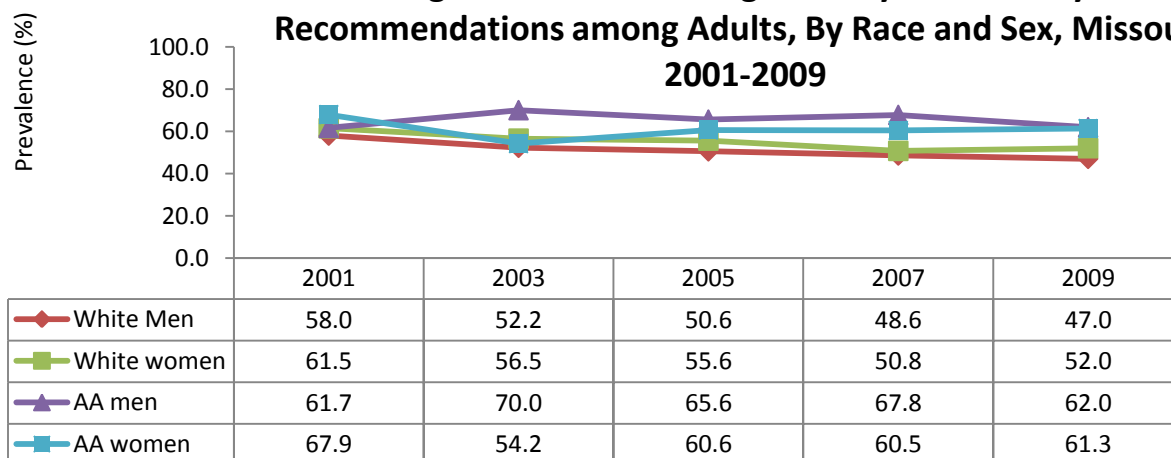
Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Figure 79. Not Meeting CDC Physical Activity Recommendations among Adults, US and Missouri, 2001-2009



There was a significant downward trend in the percentage of adults who did not meet CDC physical activity recommendations⁸ in both the US and Missouri. Missouri's prevalence has been consistently higher than that in the US; however, the difference between Missouri and the US decreased in the last decade (Figure 79).

Figure 80. Not Meeting CDC Physical Activity Recommendations among Adults, By Race and Sex, Missouri, 2001-2009



In Missouri, the prevalence of not meeting CDC physical activity recommendations tended to be higher among African-American men than among other racial and gender groups. There was a significant downward trend in the prevalence among white men and women, but not among African-American men and women (Figure 80).

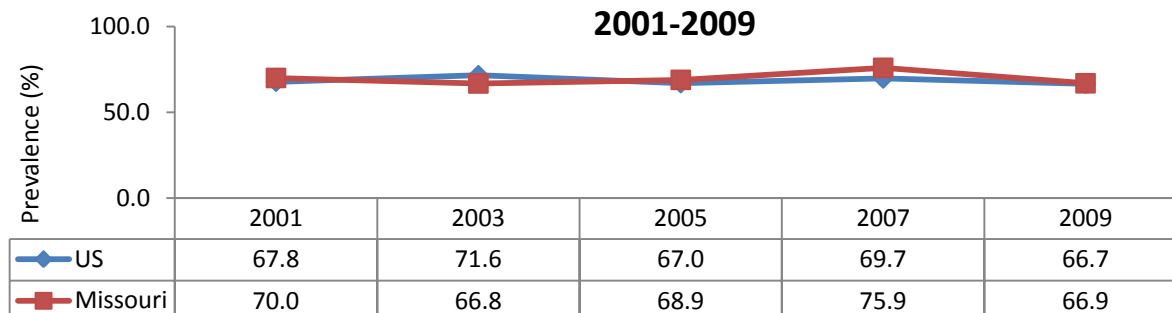
Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

⁸ CDC physical activity recommendations: moderate physical activity 30 minutes per day, five days per week, or vigorous physical activity 20 minutes per day, three days per week.

Physical Inactivity among Youth

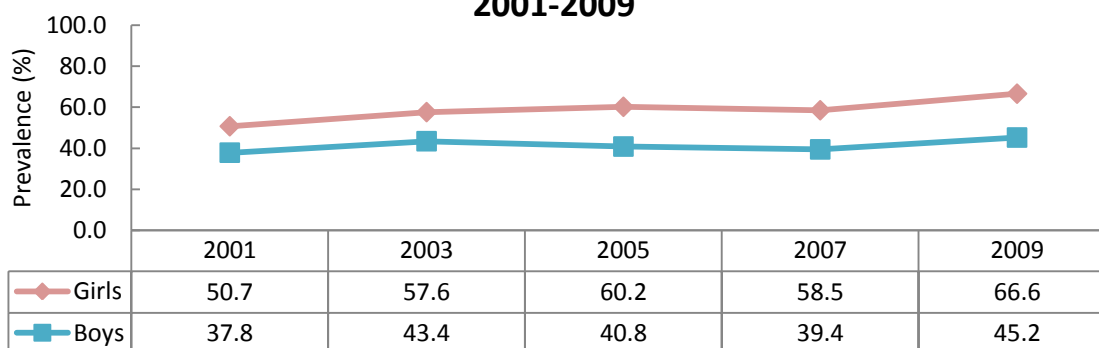
In 2009, more than one-half (51.9%) of high school students were not physically active for at least 60 minutes per day on five or more days per week in Missouri. The prevalence was significantly higher among high school girls than among high school boys.

Figure 81. Did Not Attend Physical Education Classes in an Average Week among High School Students, Missouri and US, 2001-2009



Similar to the US, about two-thirds of high school students did not attend physical education classes in an average week in Missouri during 2001-2009 (Figure 81).

Figure 82. Did Not Attend Physical Education Classes in an Average Week Among High School Students, Missouri, 2001-2009

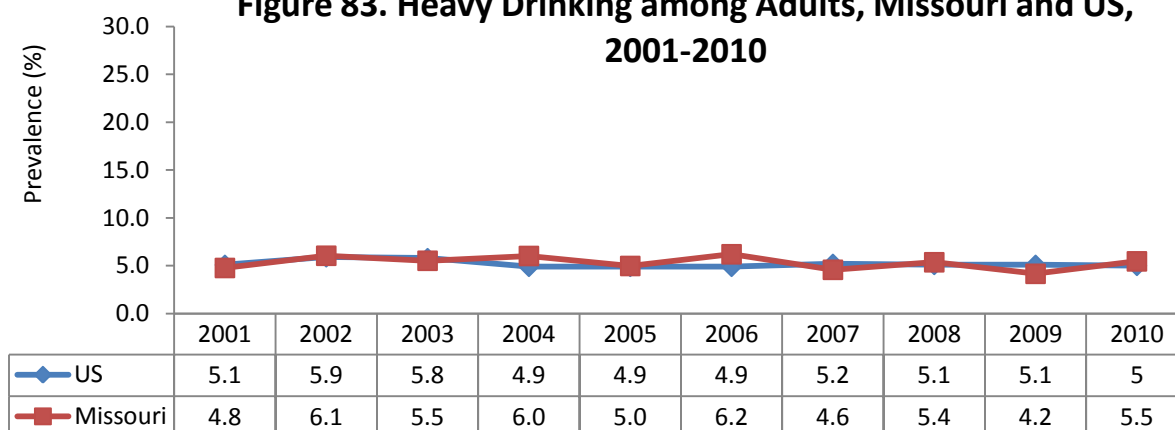


A significantly higher percentage of high school girls than boys did not attend physical education classes in an average week in Missouri during 2001-2009. In addition, the prevalence of not attending physical education classes in an average week increased significantly among high school students from 2001 to 2009 (Figure 82).

Source: Youth Risk Behavior Survey, Centers for Disease Control and Prevention and Centers for Disease Control and Prevention

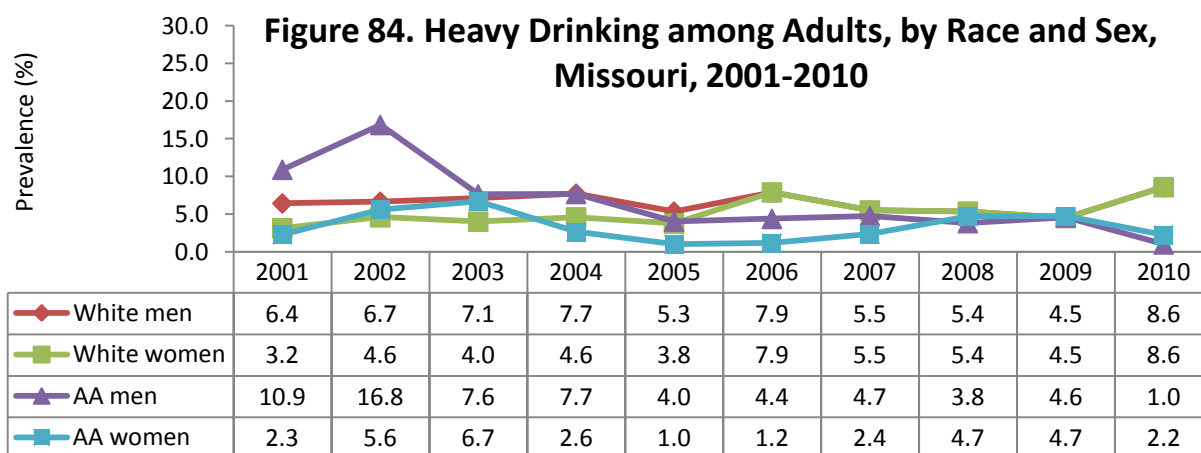
Heavy Drinking⁹ among Adults

Figure 83. Heavy Drinking among Adults, Missouri and US, 2001-2010



Prevalence of heavy drinking among adults had been stable in the last decade, around 5% both nationally and in Missouri (Figure 83).

Figure 84. Heavy Drinking among Adults, by Race and Sex, Missouri, 2001-2010



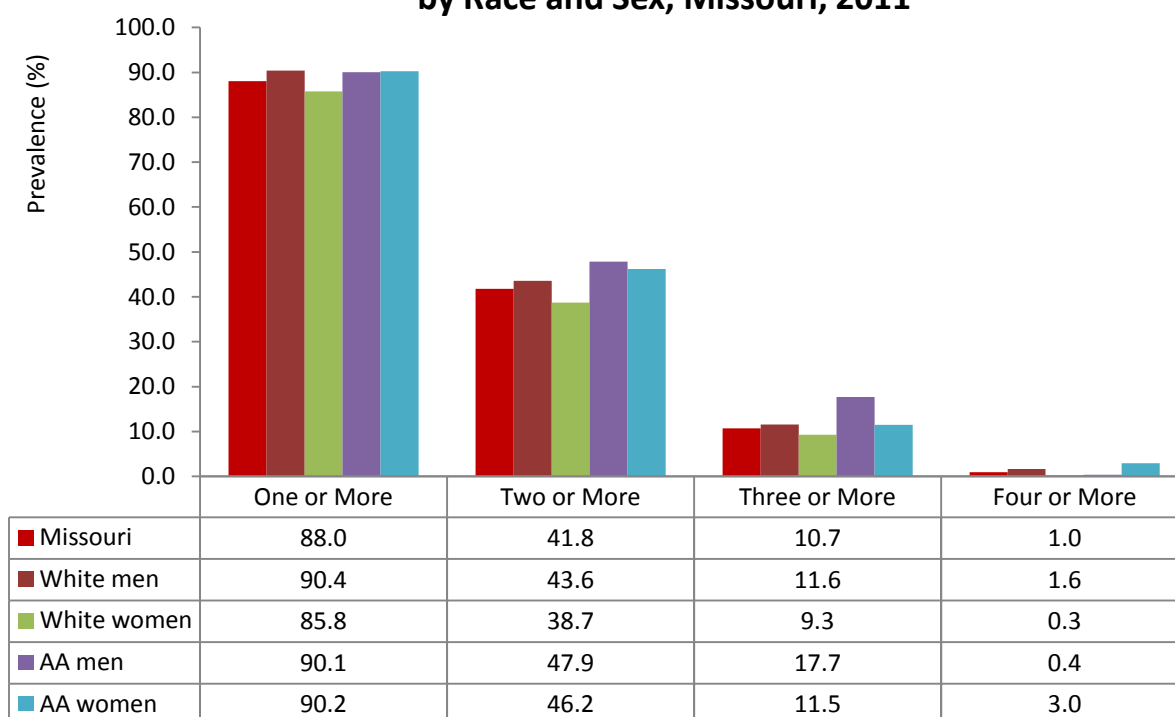
There was a significant downward trend during the last decade in the prevalence of heavy drinking among African-American men in Missouri (Figure 84).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

⁹ Heavy drinking is defined as adult men having more than two drinks per day and adult women having more than one drink per day.

Multiple Risk Behaviors

Figure 85. Prevalence of Multiple Risk Behaviors among Adults, by Race and Sex, Missouri, 2011



These chronic diseases share common risk factors - smoking, lack of physical activity, unhealthy diets and heavy drinking. In 2011, 23.0 percent of Missouri adults were current smokers, 23.7 percent were physically inactive, 87.4 percent did not consume fruits and vegetables five or more times per day, and 7.3 percent drank alcohol heavily. Overall, 88.0 percent of adults had at least one of the four risk factors, 41.8 percent had at least two, and 10.7 percent had at least three. The prevalence of multiple risk behaviors was higher among African-American men than among other racial and gender groups (Figure 85).

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

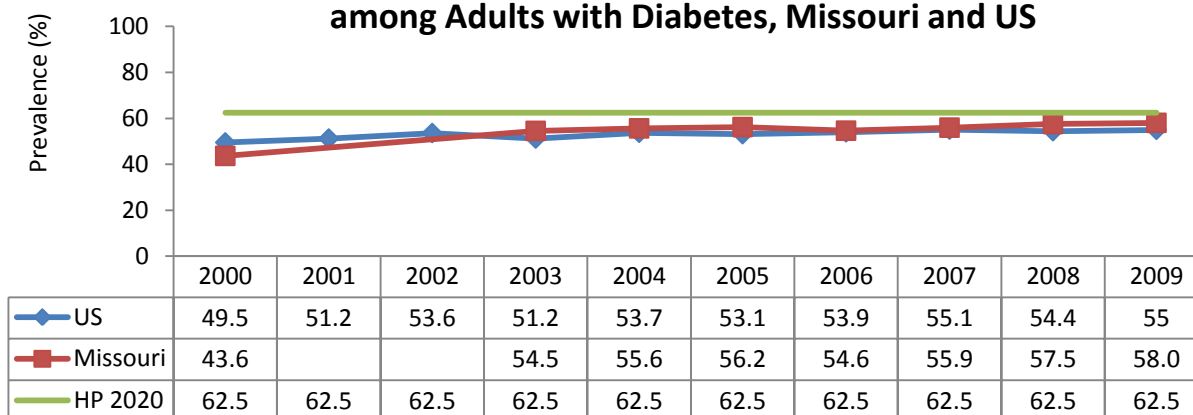
Part Four: Chronic Diseases Care and Self-management

Chapter VII: Chronic Disease Self-management

Chronic disease self-management is important for preventing complications and improving quality of life for people with chronic diseases. This chapter includes data on participating in self-management education classes among adults with diabetes and arthritis, daily self-monitoring of blood glucose among adults with diabetes, and the prevalence of smoking and physical inactivity among adults with chronic diseases.

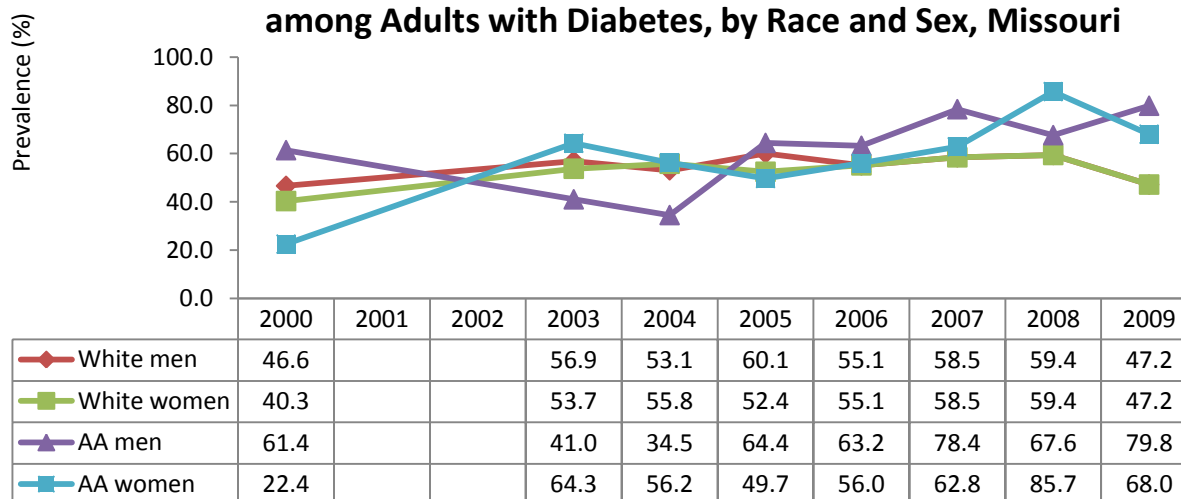
Diabetes Self-management Education

Figure 86. Ever Attended a Diabetes Self-management Class among Adults with Diabetes, Missouri and US



In the last decade, there was a significant upward trend in the percentage of adults with diabetes who had ever attended a diabetes self-management class in both the US and Missouri, approaching the Healthy People 2020 Objective of 62.5 percent (Figure 86). Missouri's prevalence has been slightly higher than that in the US since 2003.

Figure 87. Ever Attended a Diabetes Self-management Class among Adults with Diabetes, by Race and Sex, Missouri

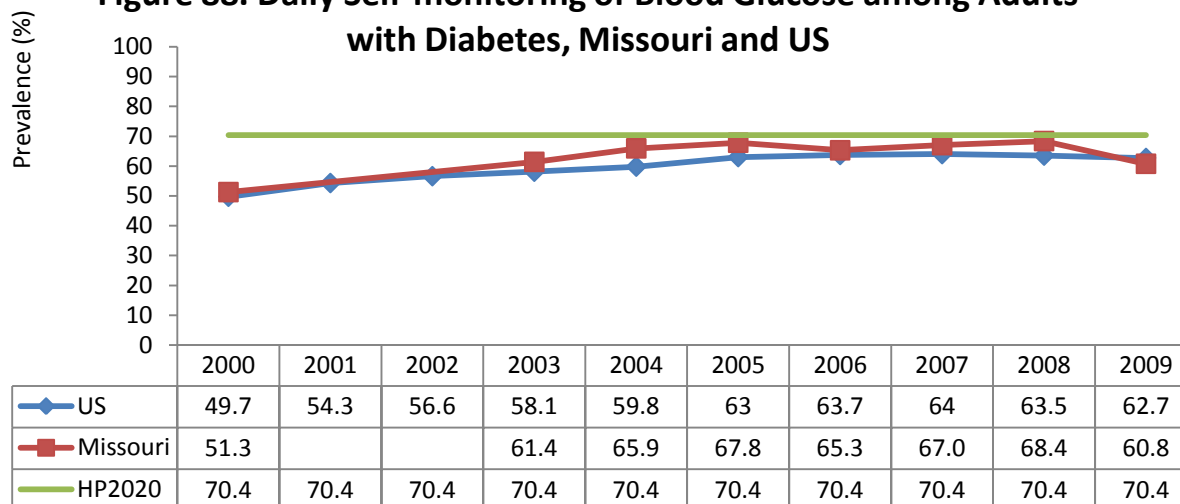


In Missouri, there was a significant upward trend in the percentage of African-American men with diabetes who had ever attended a diabetes self-management class since 2003. The prevalence also increased significantly from 2000 to 2009 among African-American women (Figure 87).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

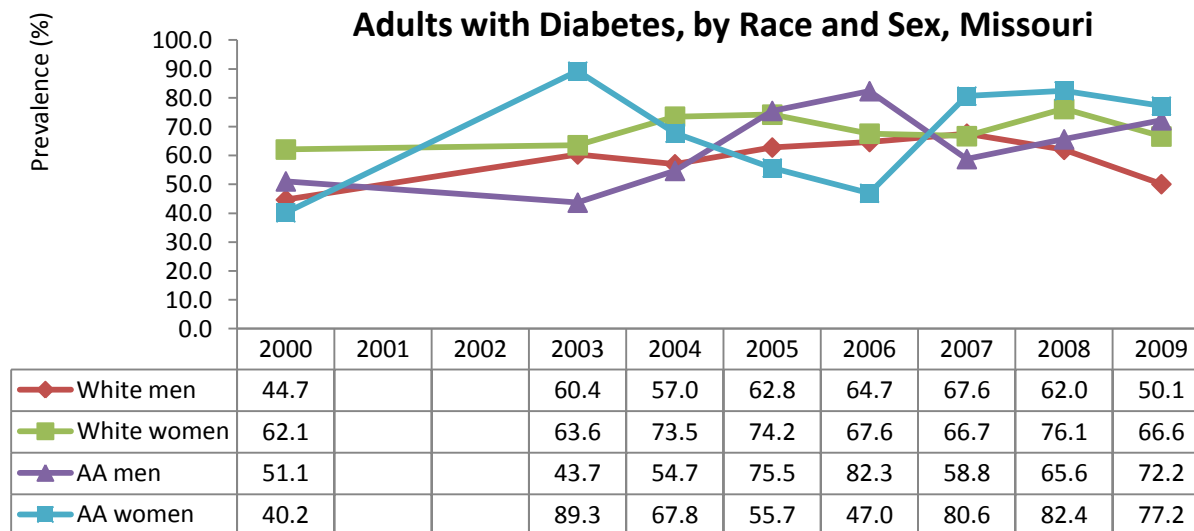
Self-monitoring of Blood Glucose among Adults with Diabetes

Figure 88. Daily Self-monitoring of Blood Glucose among Adults with Diabetes, Missouri and US



There was a significant upward trend in the percentage of daily self-monitoring of blood glucose among adults with diabetes in the US, as well as in Missouri though 2008. Missouri's prevalence was higher than the US until 2009 (Figure 88).

Figure 89. Daily Self-monitoring of Blood Glucose among Adults with Diabetes, by Race and Sex, Missouri

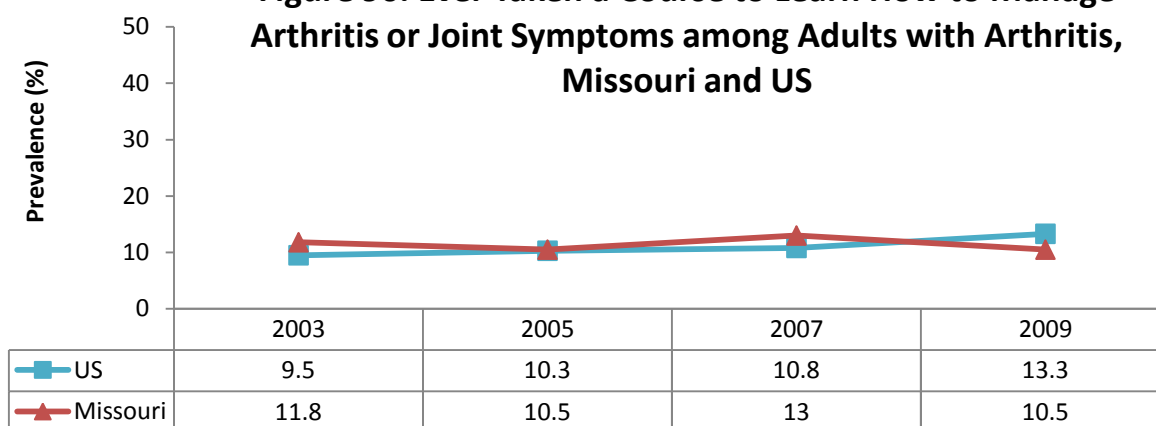


There was no significant trend in the percentage of daily self-monitoring of blood glucose among any racial and gender group in Missouri (Figure 89).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Arthritis Self-management Education

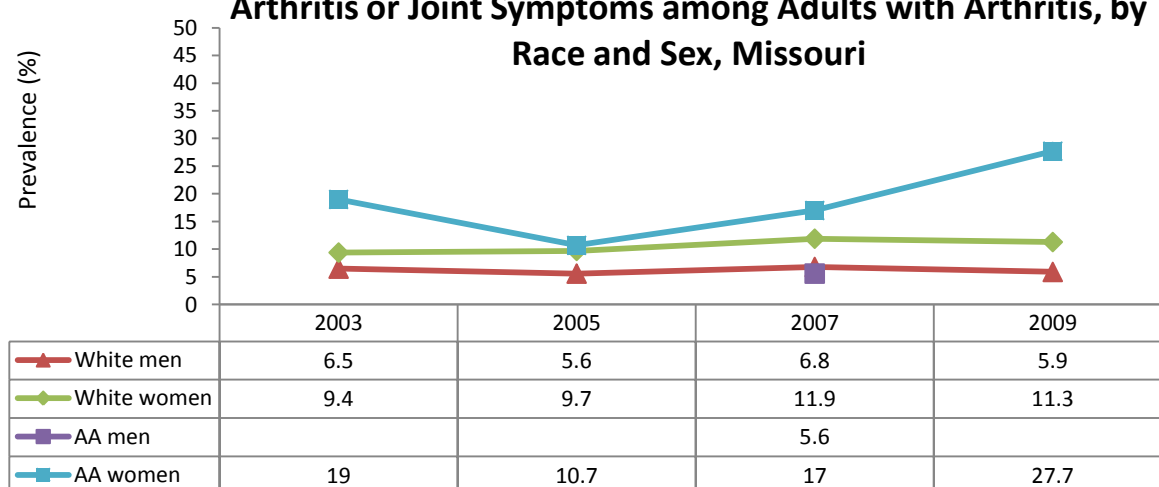
Figure 90. Ever Taken a Course to Learn How to Manage Arthritis or Joint Symptoms among Adults with Arthritis, Missouri and US



The percentage of adults with arthritis who have ever taken a course to learn how to manage arthritis or joint symptoms was similar between Missouri and the US (Figure 90).

The percentage of African-American women with arthritis who have ever taken a course to learn

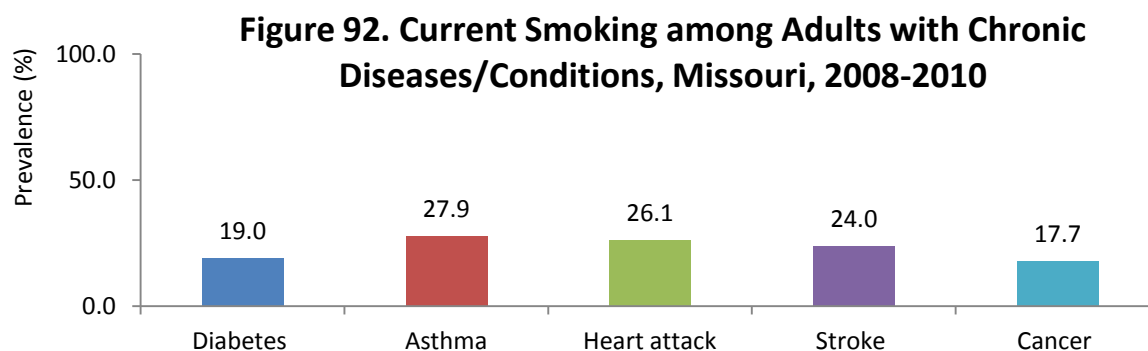
Figure 91. Ever Taken a Course to Learn How to Manage Arthritis or Joint Symptoms among Adults with Arthritis, by Race and Sex, Missouri



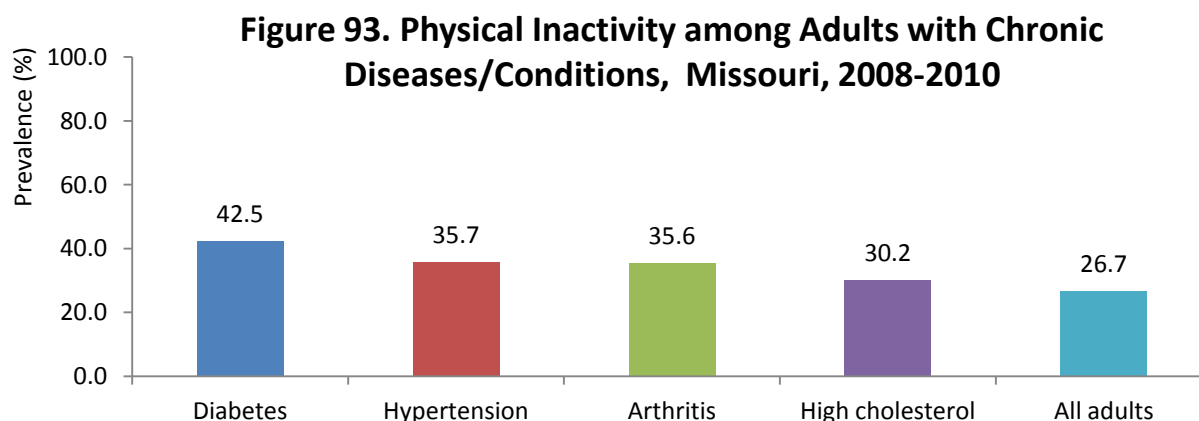
how to manage arthritis or joint symptoms tends to be higher (Figure 91) than other racial and gender groups. The number of African-American men with arthritis was too small to generate reliable estimates, except for 2007.

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Risk Behaviors among Adults with Chronic Diseases



Among people with chronic diseases, a healthy life-style is important for preventing complications and improving quality of life. However, a high percentage of Missouri adults with chronic diseases were current smokers, including 19.0 percent of adults with diabetes, 27.9 percent of adults with asthma, 26.1 percent of adults who ever had a heart attack, 24.0 percent of adults who ever had a stroke, and 17.7 percent of cancer survivors (Figure 92).



Physical activity is important for preventing chronic diseases. For people with chronic diseases/conditions, an appropriate level of physical activity is important for preventing complications. During 2008-2010, a high percentage of adults in Missouri did not engage in any leisure-time physical activity (26.7%). The prevalence is especially high among those with chronic diseases/conditions, 42.3 percent among adults with diabetes, 35.7 percent among those with hypertension, 35.6 percent among those with arthritis, and 30.2 percent among those with high cholesterol (Figure 93).

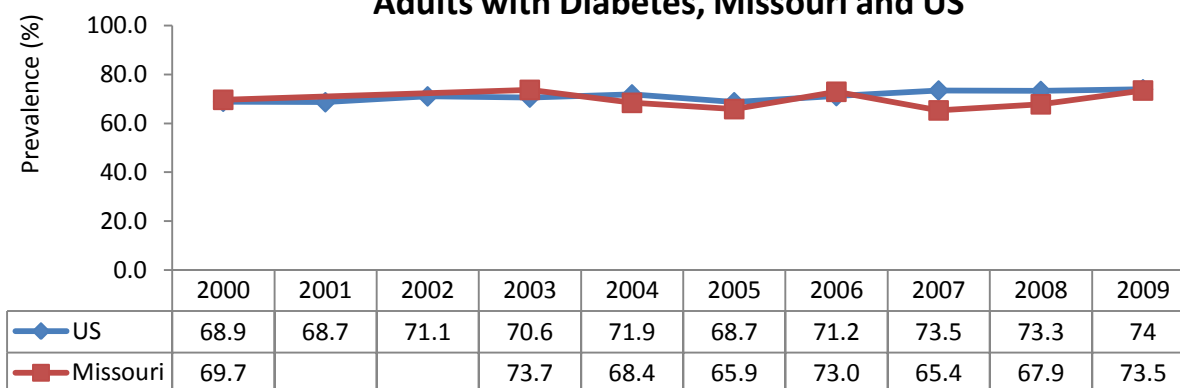
Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Chapter VIII: Chronic Disease Management and Care

High quality and continuity of care for people with chronic disease is very important for improving outcomes and quality of life, and reducing healthcare cost. This chapter presents data on A1C test, foot exam, eye exam, and flu and pneumococcal vaccinations among people with diabetes.

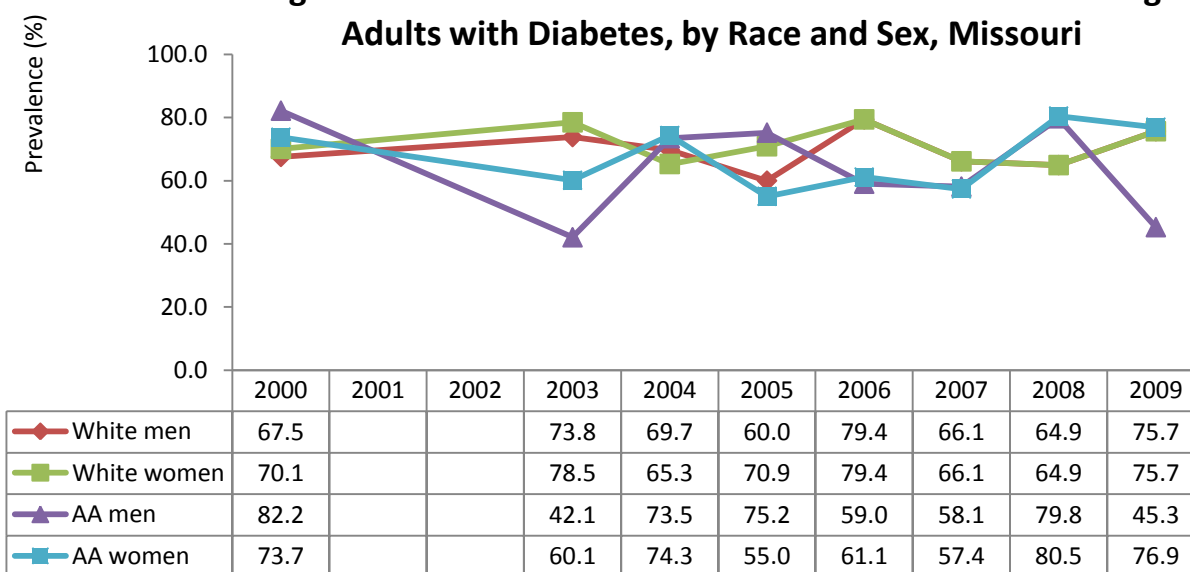
Hemoglobin A1C Monitoring among Adults with Diabetes

Figure 94. Had 2 or more A1C Tests in the Last Year Among Adults with Diabetes, Missouri and US



There was a significant upward trend in the percentage of adults with diabetes who had 2 or more A1C tests in the last year in the US, but not in Missouri. The prevalence was similar between Missouri and US in 2009 (Figure 94).

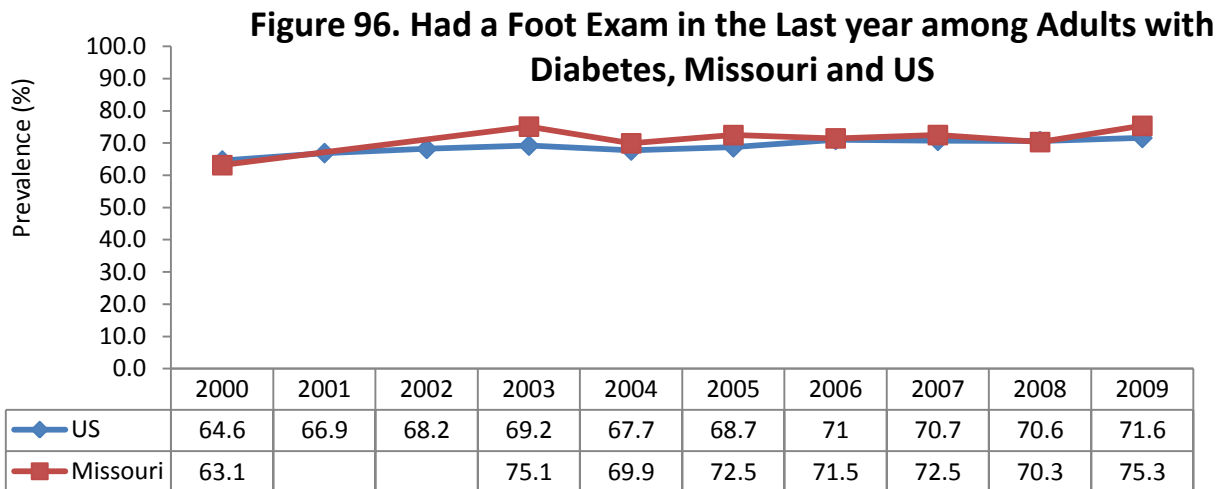
Figure 95. Had 2 or more A1C Tests in the Last Year Among Adults with Diabetes, by Race and Sex, Missouri



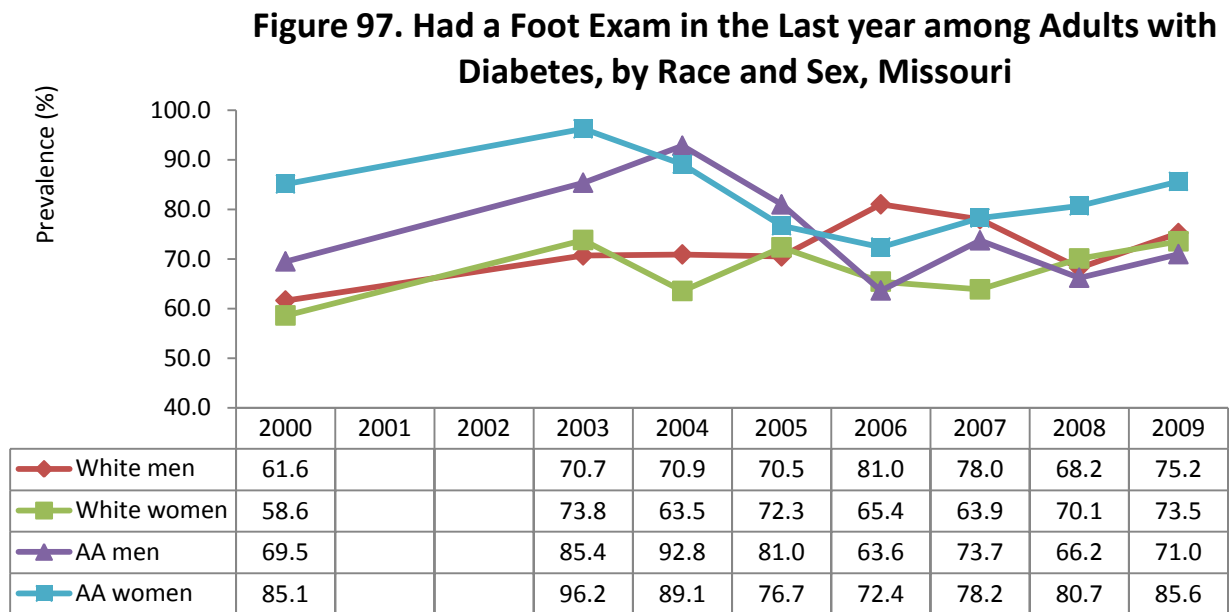
There was no significant disparity or trend in the percentage of adults with diabetes who had two or more A1C tests in the last year among racial and gender groups (Figure 95).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Foot Exam among Adults with Diabetes



There was a significant upward trend in the percentage of adults with diabetes who had a foot exam in the last year in the US, but not in Missouri. Missouri's prevalence has been slightly higher than the US in most years of the last decade (Figure 96).

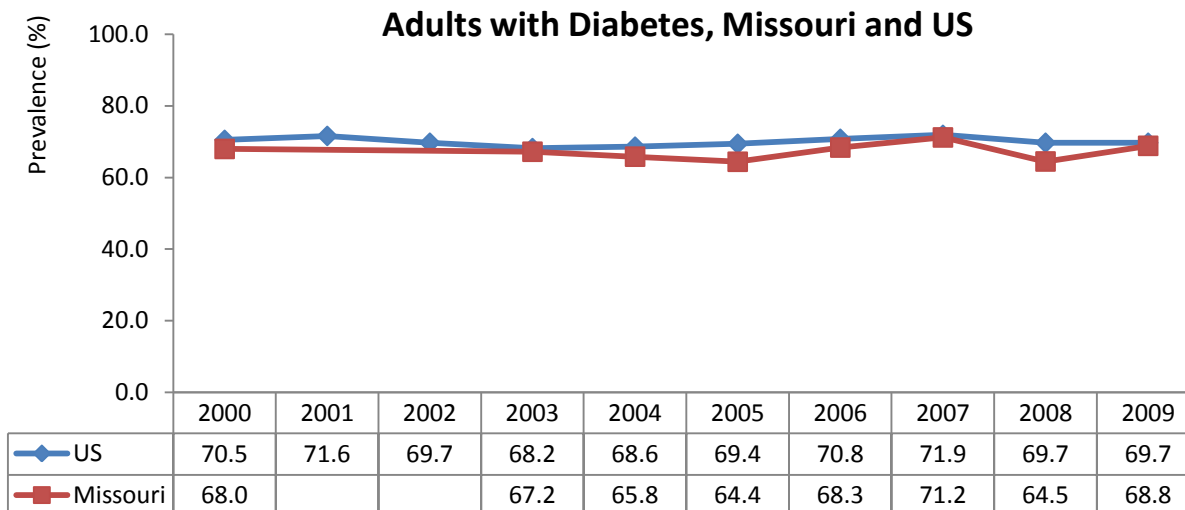


There was no significant disparity or trend in the percentage of adults with diabetes who had a foot exam in the last year among racial and gender groups in Missouri (Figure 97).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

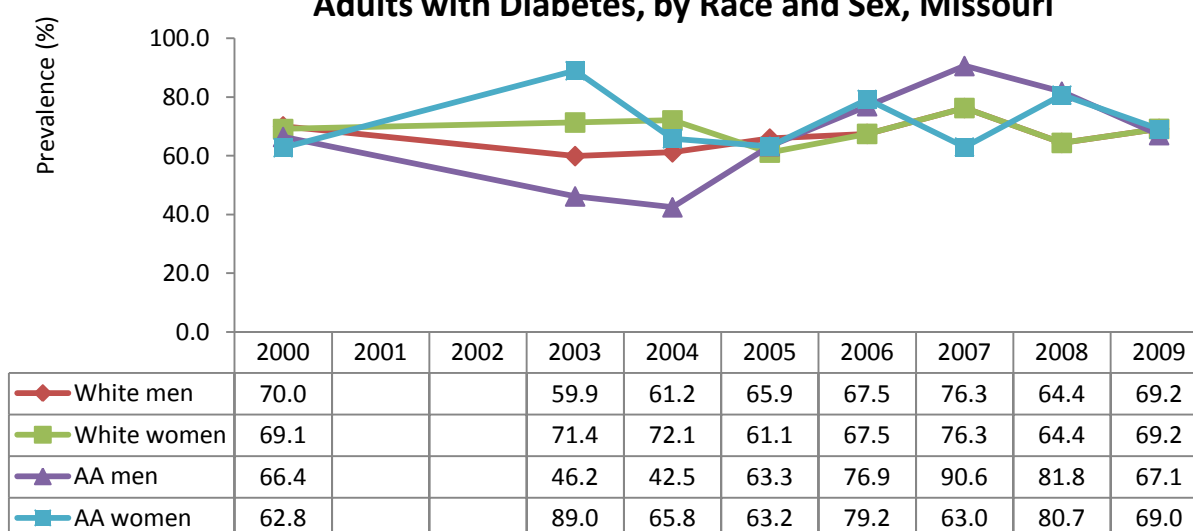
Eye Exam among Adults with Diabetes

Figure 98. Had a Dilated Eye Exam in the Last Year among Adults with Diabetes, Missouri and US



The percentage of adults with diabetes who had a dilated eye exam in the last year was slightly lower in Missouri than in the US in the last decade. There was no significant trend either in Missouri or the US (Figure 98).

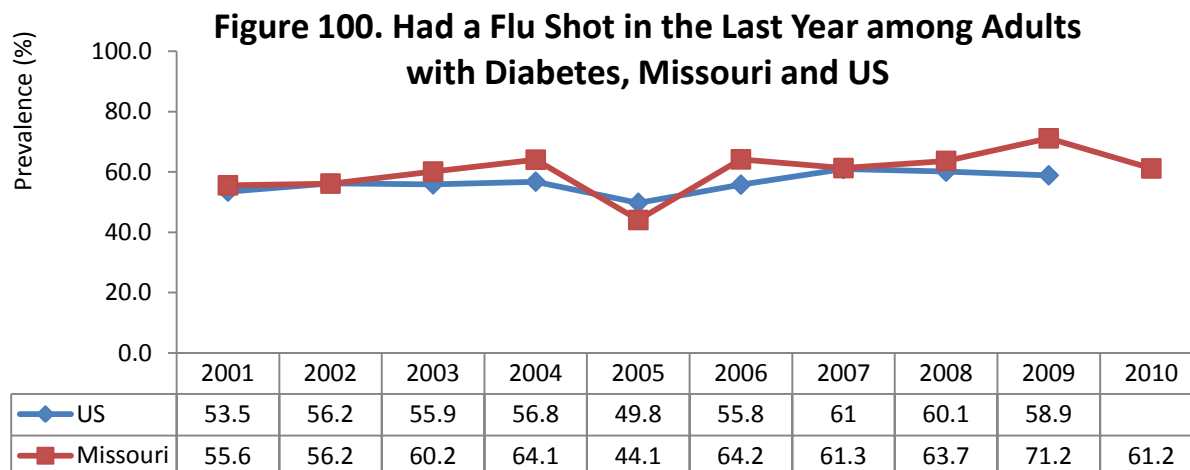
Figure 99. Had a Dilated Eye Exam in the Last Year among Adults with Diabetes, by Race and Sex, Missouri



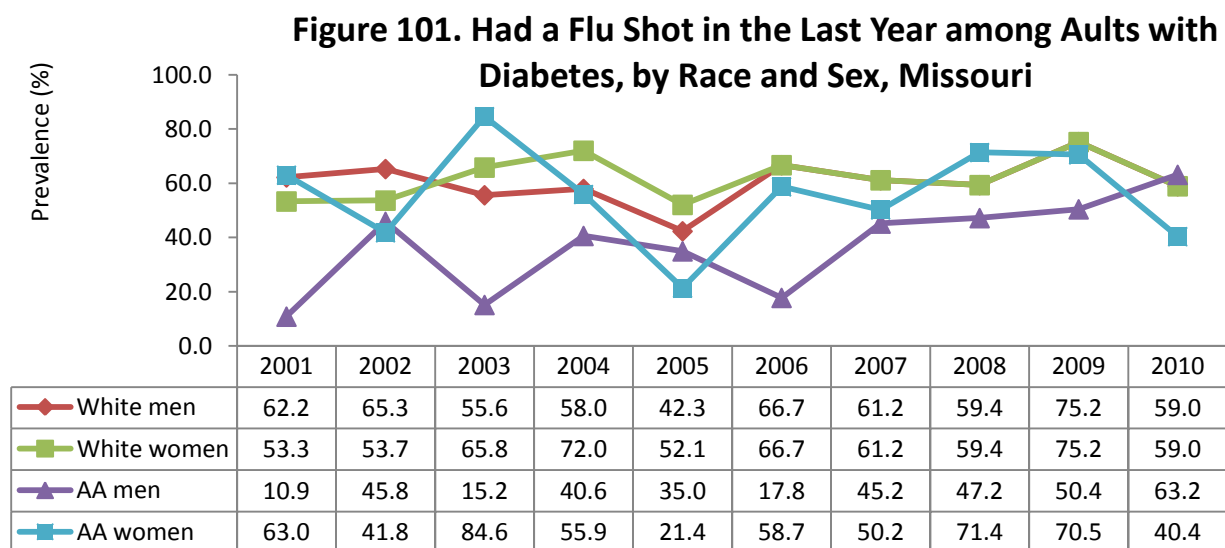
There was no significant disparity or trend in the percentage of adults with diabetes who had a dilated eye exam in the last year among racial and gender groups (Figure 99).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Flu Shot among Adults with Diabetes



The percentage of adults with diabetes who had a flu shot in the last year has been slightly higher in Missouri than in the US in the last decade. There was no significant trend in either Missouri or the US (Figure 100).

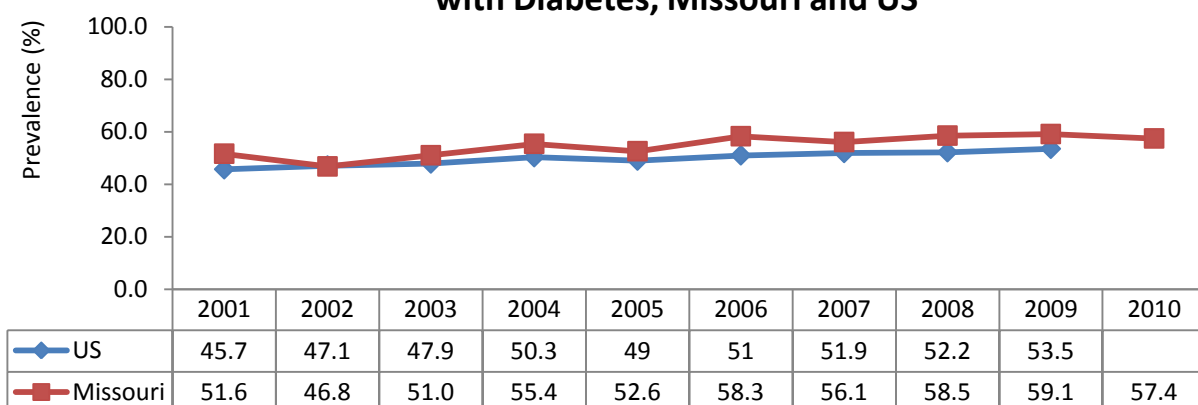


There was a significant upward trend in the percentage of African-American men with diabetes who had a flu shot in the last year (Figure 101). African-American men with diabetes had a very low prevalence of flu shot in the early 2000 years, but gradually increased until in 2010, the prevalence among African-American men was higher than the other racial and gender groups.

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

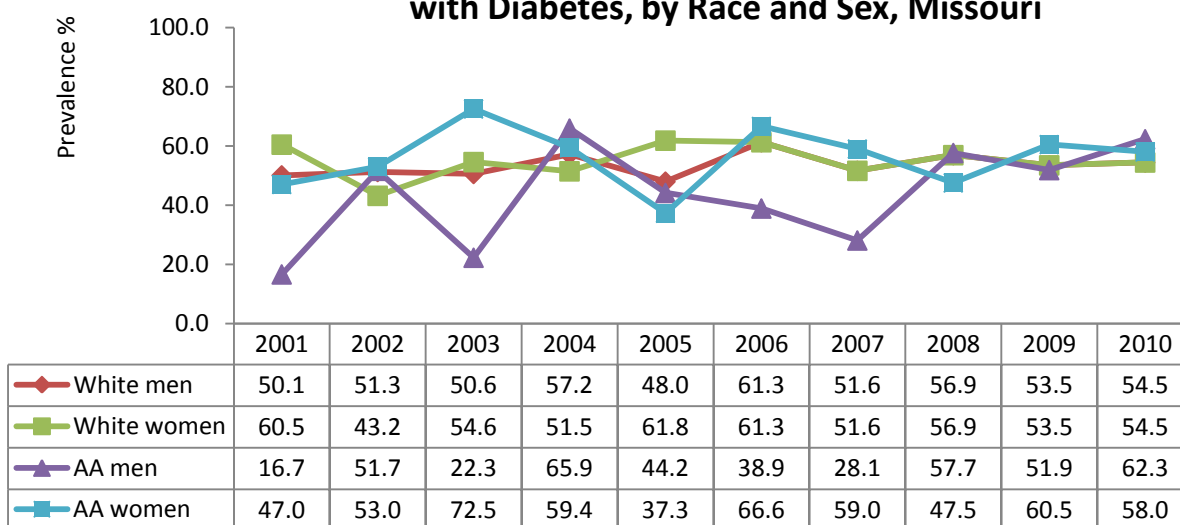
Pneumococcal Vaccination among Adults with Diabetes

Figure 102. Ever had a Pneumococcal Vaccination among Adults with Diabetes, Missouri and US



There was a significant upward trend in the percentage of adults with diabetes who had ever had a pneumococcal vaccination in both the US and Missouri. The prevalence in Missouri was higher than that in the US (Figure 102).

Figure 103. Ever had a Pneumococcal Vaccination among Adults with Diabetes, by Race and Sex, Missouri



The prevalence among African-American men was lower than other racial and gender groups in 2001, but it caught up in recent years. The racial and gender differences have decreased (Figure 103).

Source: Behavioral Risk Factor Surveillance System, Missouri Department of Health and Senior Services and Centers for Disease Control and Prevention

Part Five: Socio-Economic Status and Chronic Diseases and Risk Factors

Chapter IX: Social Determinants of Health

The social determinants of health are the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics.¹⁰ The WHO Commission on Social Determinants of Health concluded in 2008 that the social conditions are the single most important determinant of one's health status. Certainly, individual choices are important, but factors in the social environment are what influence lifestyle choices and determine access to health services in the first place.¹¹

¹⁰ World Health Organization. Social Determinants of Health. Available from: http://www.who.int/social_determinants/en/

¹¹ Satcher D. Include a social Determinants of Health Approach to Reduce Health Inequalities. Public Health Rep. 2010; 125(Suppl 4): 6–7.

Income and Poverty

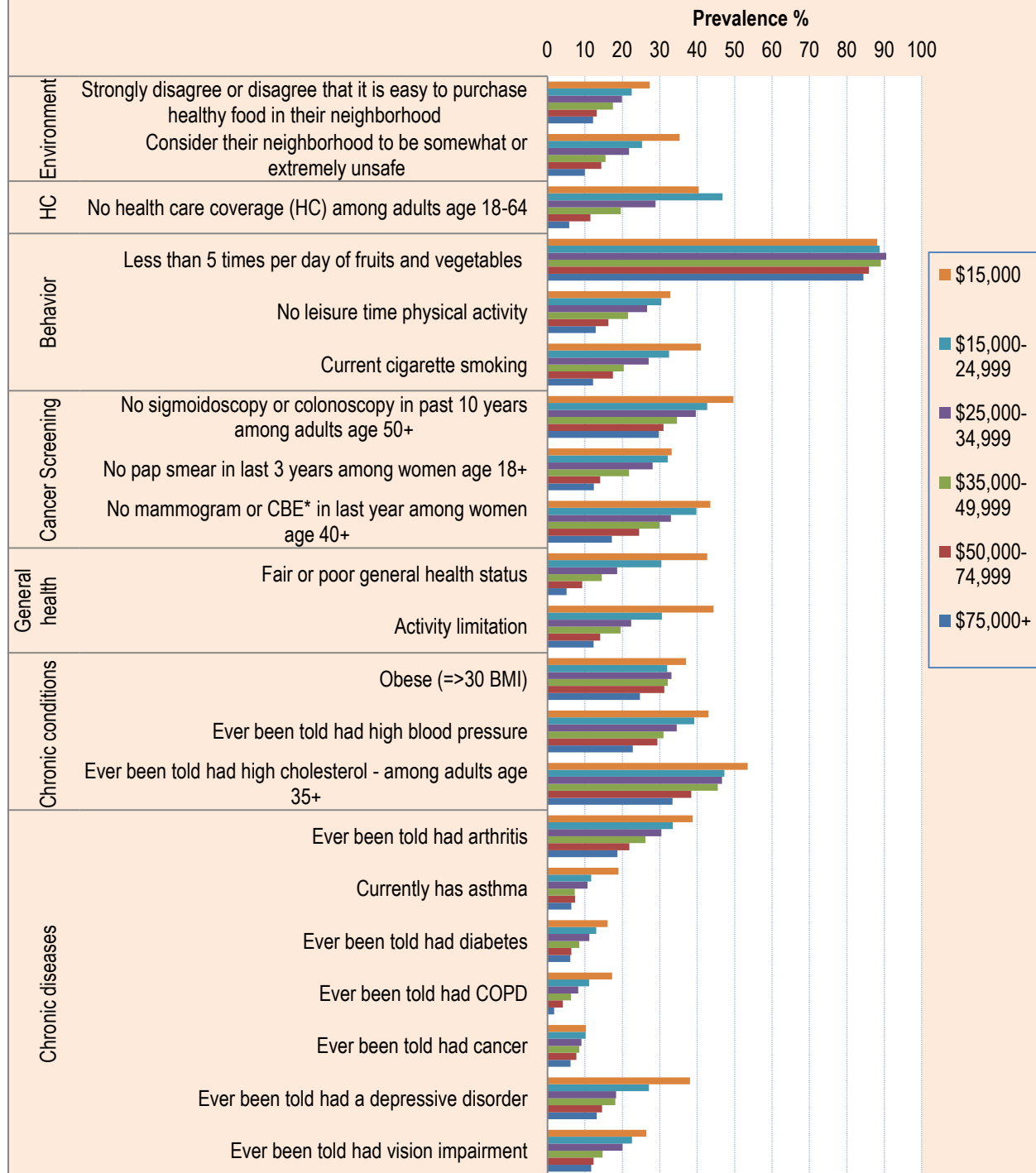
There is a positive association between income and health. However, the relationship between income and health is not linear. Differences in income generally make the greatest difference in health at the lower income level; increase in income for the highest income groups may not produce significant gains in health.

In Missouri, household income level is associated with almost every indicator of health. Individuals in poverty have the worst health indicators, including the prevalence of chronic diseases, conditions, risk behaviors, preventive care practices, health care coverage, and living environments (Figure 104). People in middle income levels have worse health than people in the highest income level.

In 2011, 15.8 percent or 920,118 Missourians lived in a family with a household income below the poverty level (e.g. \$22,811 per year for a family of four in 2011). Poverty is distributed unevenly within the state. In 2010, poverty rates ranged from 6.1 percent in St. Charles County to 31.3 percent in Pemiscot County (Figure 105). Overall, the 2011 poverty rate was more than twice as high among African-Americans as among whites (15% vs. 39% in Missouri and 13% vs. 35% nationally).¹²

¹² The Henry J. Kaiser Family Foundation, State Health Facts: Poverty Rate by Race/Ethnicity, Data Source: Census Bureau's March 2011 and 2012 Current Population Survey (CPS: Annual Social and Economic Supplements). Available from: <http://kff.org/other/state-indicator/poverty-rate-by-raceethnicity/#>

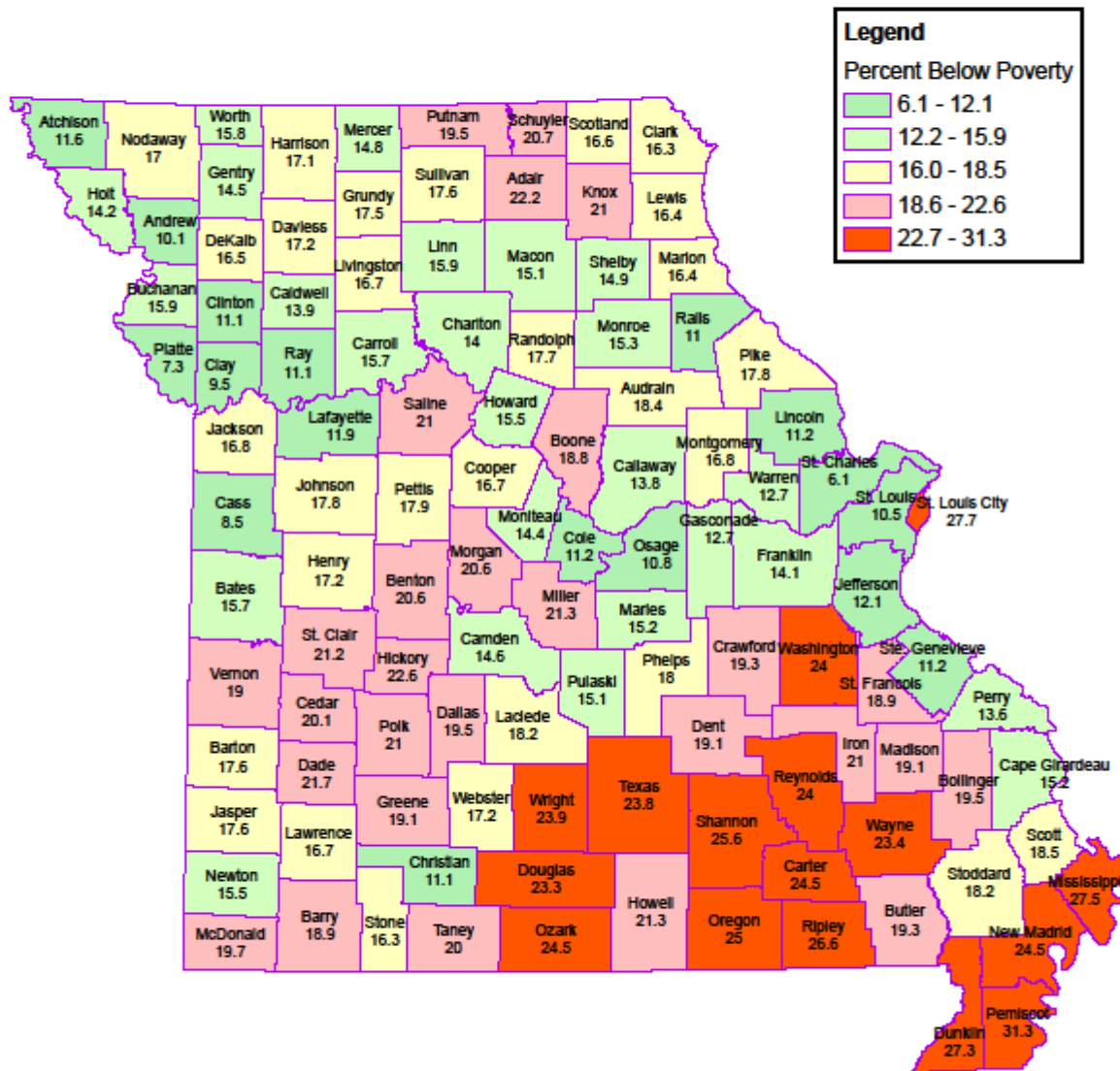
Figure 104. Chronic Disease Health Indicators for Adults by Household Income, Missouri, 2011



*CBE: Clinical breast exam.

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

Figure 105. Percent of Population in Poverty by County, Missouri, 2010



Education

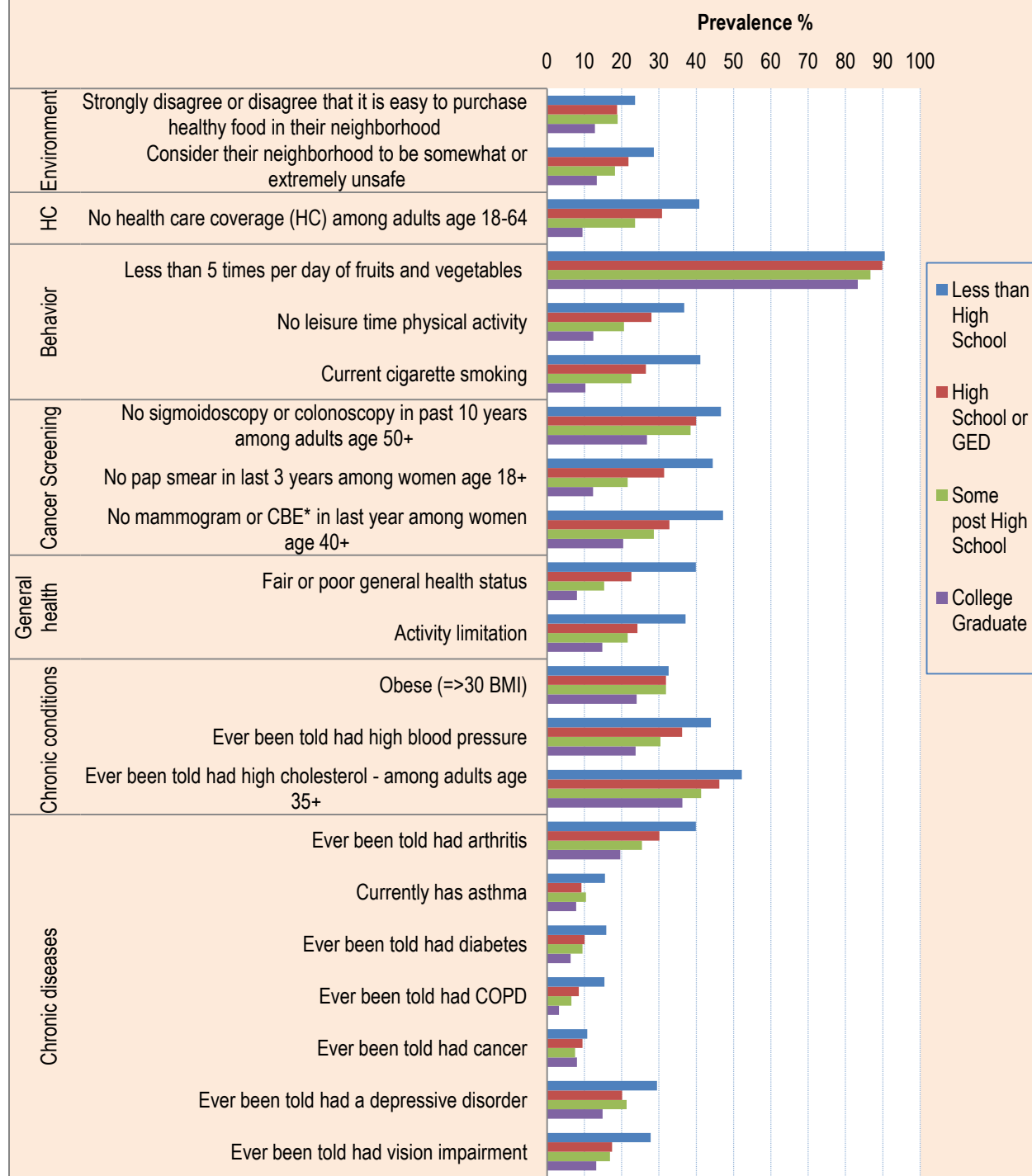
Education matters for health. In general, individuals with less education have more health problems and shorter life expectancies. In contrast, people with more years of education are likely to live longer, healthier lives. This association between education and health remains substantial and significant even after taking into account job characteristics, income, and family background. This suggests that educational policies have the potential to substantially improve health.

In Missouri, education is associated with almost all health indicators. Data from the 2011 Missouri County-level Study showed that a high proportion of Missouri adults with less than a high school education lived in an environment that was unsafe and lacked access to healthy foods. The proportion decreased as the education level increased. A similar pattern was observed for the prevalence of risk behaviors, lack of preventive care, poor general health, and chronic diseases and conditions (Figure 106).

In 2011, the proportion of Missouri adults aged 25 or older without a high school diploma was 31.4 percent, compared to 28.4 percent nationally. Education levels vary in different areas in Missouri, as shown in Figure 107. A cluster of 19 counties in southeast Missouri had the highest proportion of adults age 25 or older without a high school diploma.¹³

¹³ United States Census Bureau. Educational Attainment. Available from: <http://www.census.gov/hhes/socdemo/education/index.html>

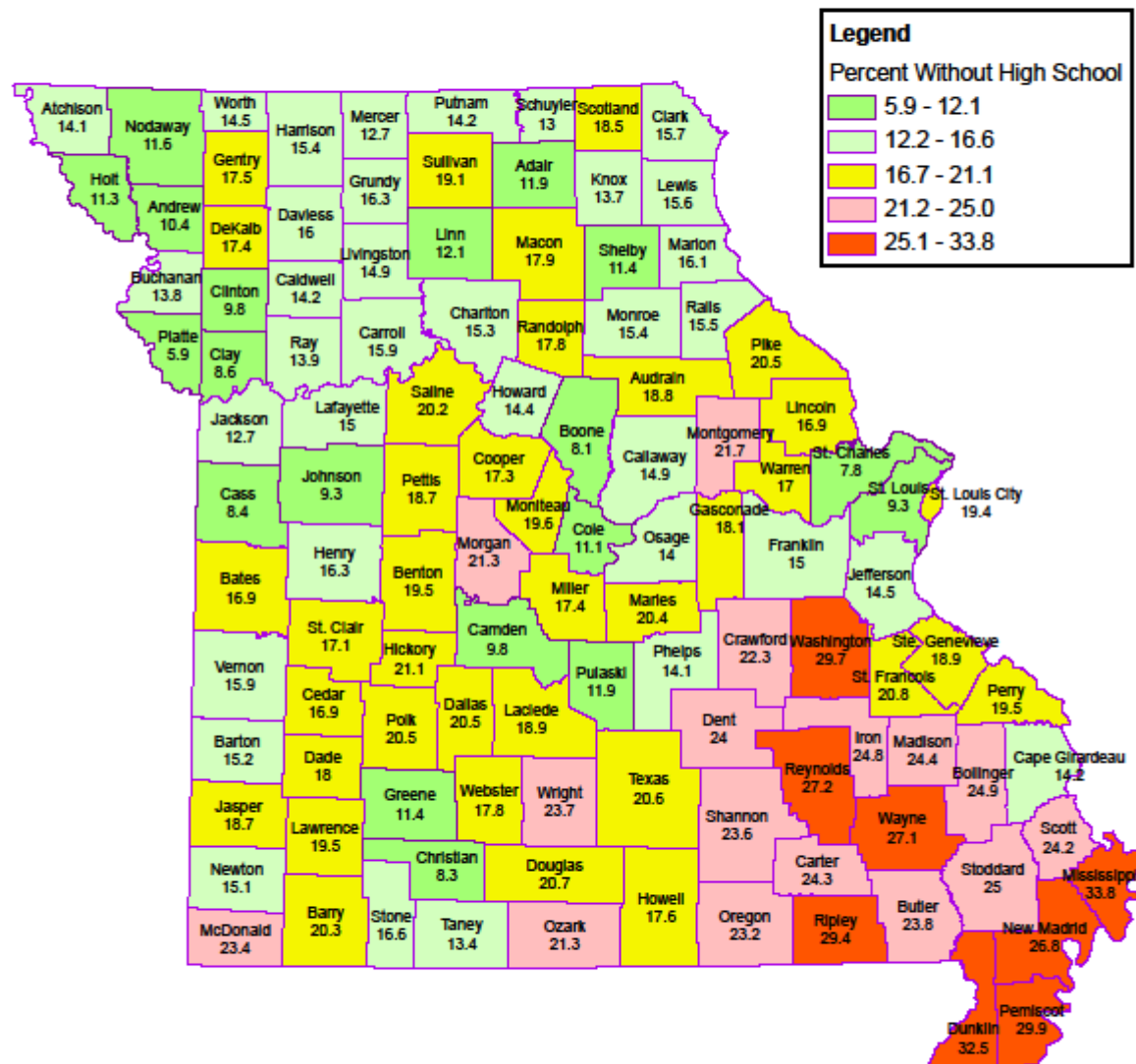
Figure 106: Chronic Disease Health Indicators for Adults by Education Level, Missouri, 2011



*CBE: Clinical breast exam.

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

Figure 107. Percent of Adults age 25 and older with less than a High School Education, Missouri, 2006-2010



Race and Ethnicity

Differences in health by race and ethnicity have been consistently observed across a range of health indicators. In general, racial and ethnic minorities have poorer health status and experience poorer health outcomes than non-minorities. The causes of these racial and ethnic disparities are complex, and have not yet to be completely understood. Socioeconomic factors, such as income and education, intertwined with many other factors, such as physical and social environments, personal behaviors, and access to and quality of health services, lead to racial and ethnic disparities in health.

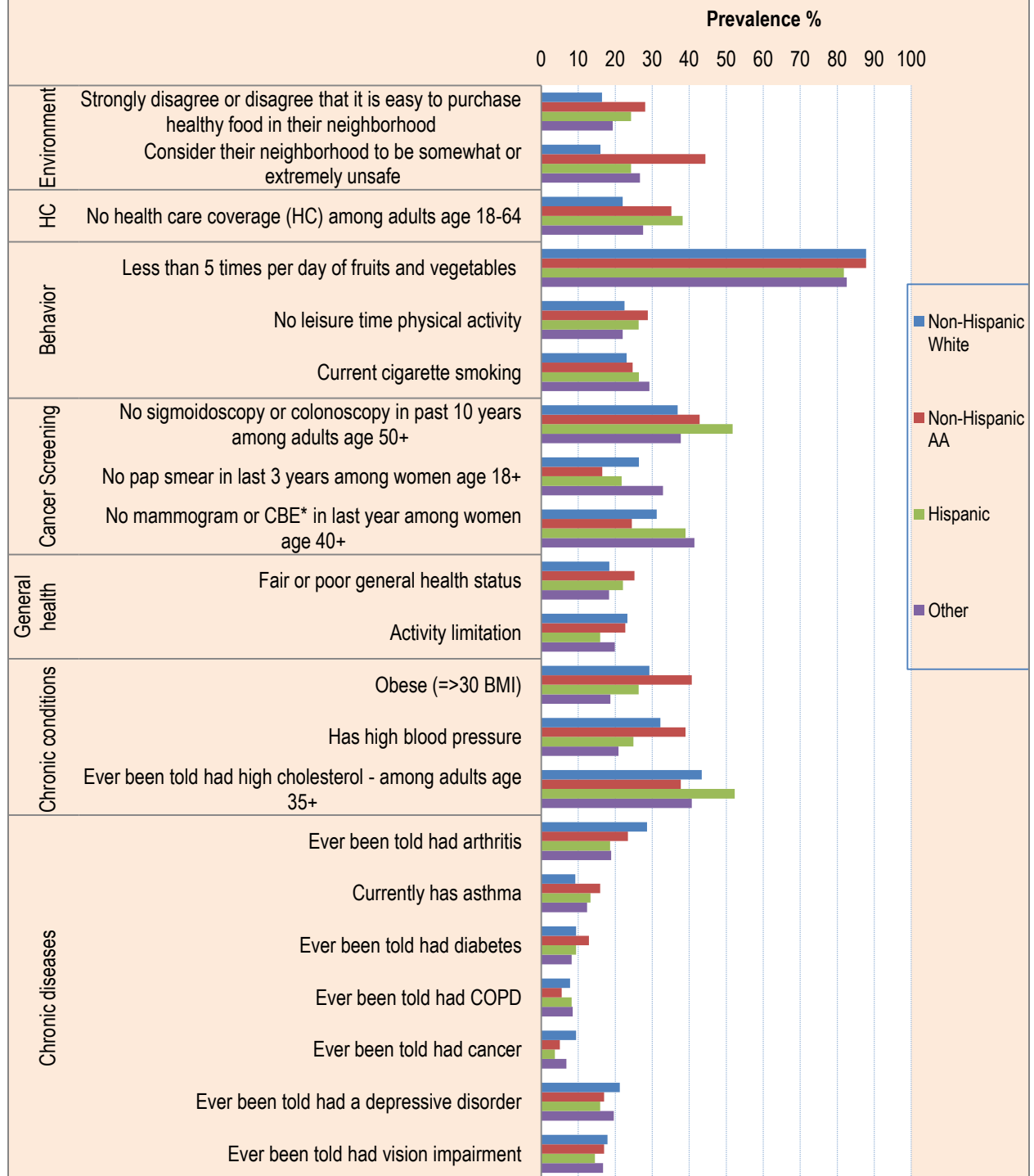
In Missouri, according the 2011 Missouri County-level Study, a significantly higher proportion of non-Hispanic African-Americans were obese, had hypertension, diabetes, asthma and no leisure time physical activity compared to non-Hispanic whites. A significantly higher proportion of Hispanics did not follow the colorectal cancer screening guidelines compared to non-Hispanic whites. On the other hand, a significantly higher proportion of non-Hispanic whites did not follow the breast and cervical cancer screening guidelines and had high blood cholesterol compared to non-Hispanic African-Americans; and had high blood pressure compared to Hispanics (Figure 108).

The United States is becoming increasingly diverse. In 2010, racial and ethnic minorities comprised approximately 36.6 percent of the US population. By 2050, it is projected that those now considered “minorities” will account for more than one-half of the United States population.¹⁴ Racial and ethnic minorities make up a smaller proportion of Missouri’s population than that of the U.S. as a whole. In 2010, 11.7 percent of Missourians were African-American and 7.5 percent were other non-white races. The Hispanic population in Missouri comprises 3.7 percent of the total population, which is much lower than the national percentage of 16.7 percent. The proportion of racial and ethnic minorities varies widely in different areas of the state, from 5.7 percent of the population in Cass County to 54.2 percent in St. Louis City (Figure 109).¹⁵

¹⁴ United State Census Bureau. Population Projections. Available from: <http://www.census.gov/population/projections/>.

¹⁵ United State Census Bureau. Race. Available from: <http://www.census.gov/population/race/data/>

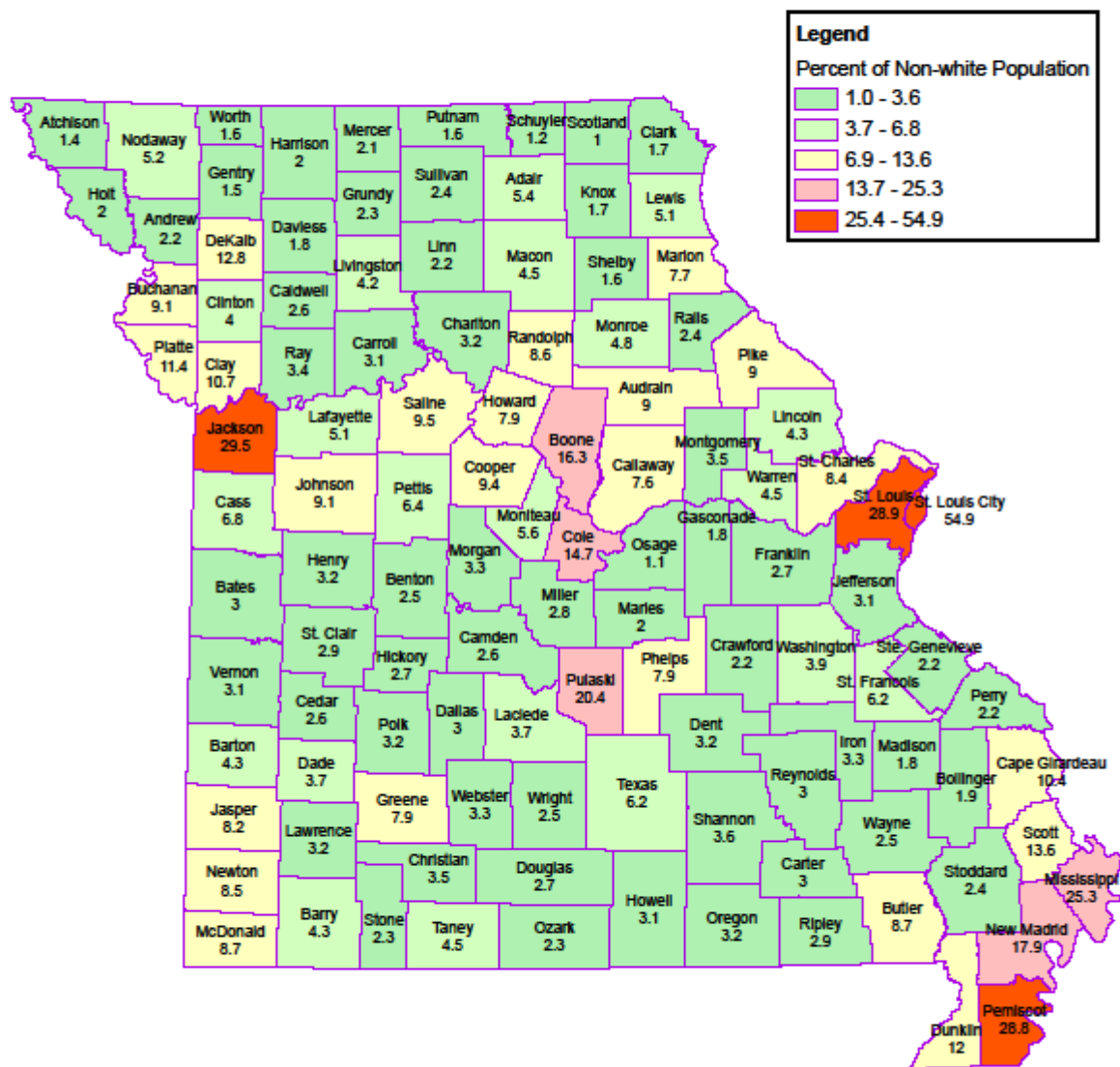
Figure 108. Chronic Disease Health Indicators for Adults by Race/Ethnicity, Missouri, 2011



*CBE: Clinical breast exam.

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

Figure 109. Percent of Racial and Ethnic Minority Population
by County, Missouri, 2010



Urbanization

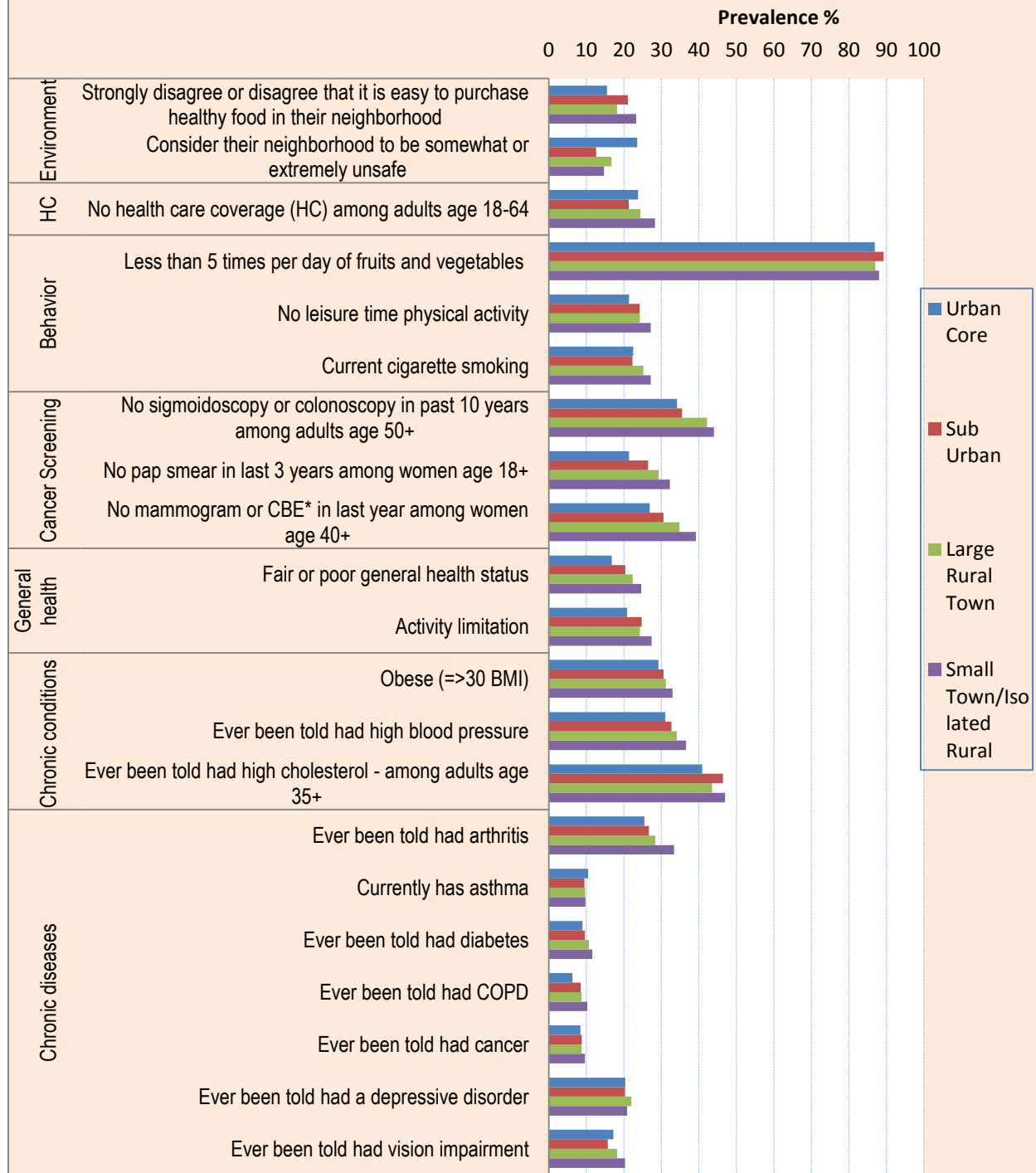
Communities at different urbanization levels differ in their environmental, demographic, social and economic characteristics, and these characteristics greatly influence the magnitude and types of health problems communities face.¹⁶ The 2011 Missouri County-level Study showed that a higher proportion of Missouri adults living in a small town or isolated rural area lacked access to healthy foods in their neighborhood, had no healthcare coverage, did not meet cancer screening guidelines, engaged in risk behaviors, and had chronic conditions and diseases (arthritis, diabetes, COPD, cancer, and vision impairment), compared to residents living in other areas. In contrast, a higher proportion of adults living in the urban core area considered their neighborhood to be somewhat unsafe or extremely unsafe, or currently had asthma (Figure 110).

The level of urbanization in this study was determined using the method developed by the University of Washington's Rural Health Research Center.¹⁷ Based on this method, about 56.1 percent of the Missouri adult population 18 years and older, lived in urban core areas, 13.5 percent in sub-Urban areas, 12.9 percent in large rural towns and 17.5 percent in small rural towns or isolated rural areas (Figure 111).

¹⁶ National Center for Health Statistics. Health, United States, 2011: With Special Feature on Socioeconomic Status and Health. Available from: [http://www.cdc.gov/nchs/data/11.pdf#listfigures](http://www.cdc.gov/nchs/data/hus/11.pdf#listfigures).

¹⁷ Rural Health Research Center. RUCA. Available from: <http://depts.washington.edu/uwruca/ruca-data.php>

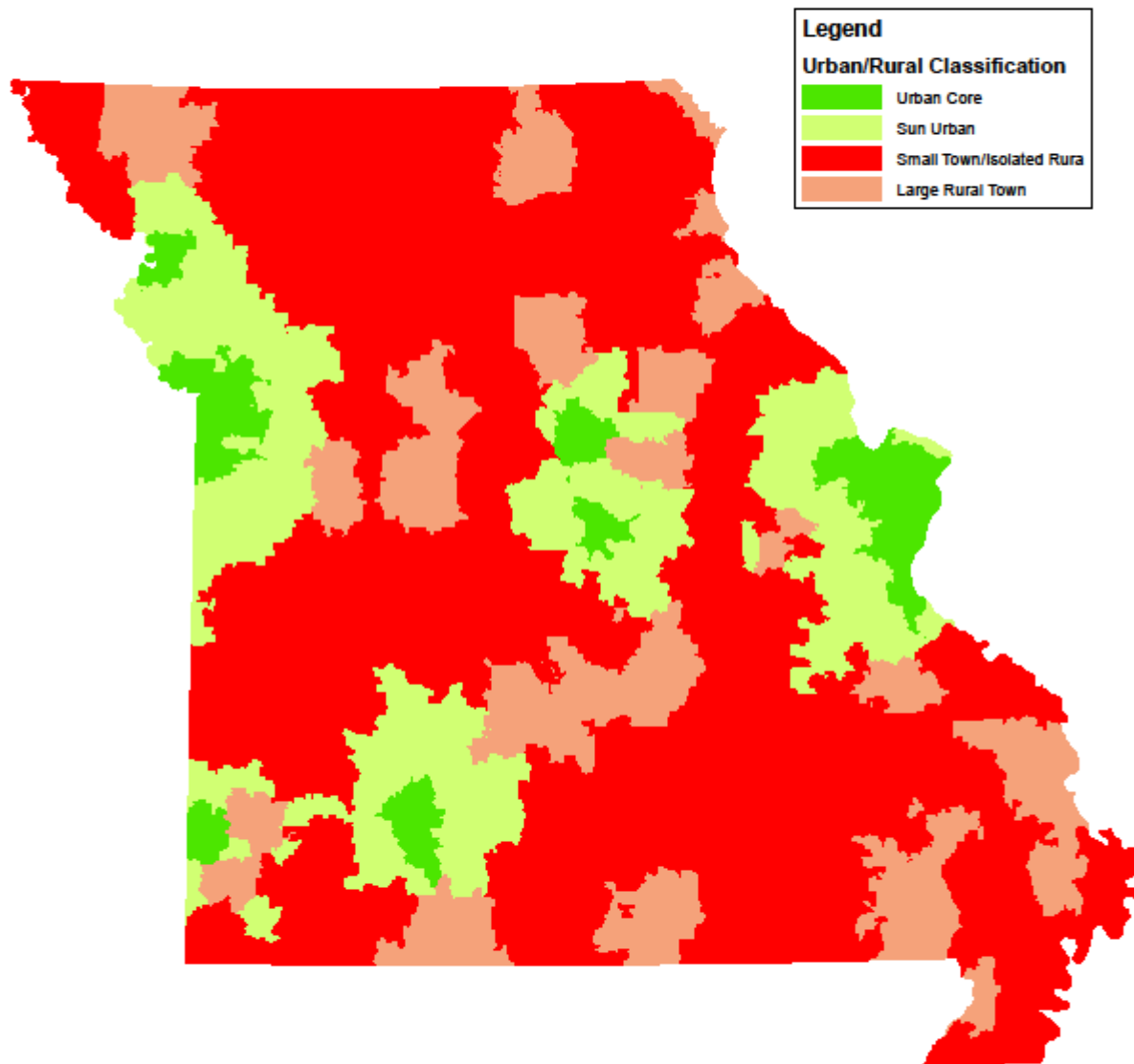
Figure 110. Chronic Disease Health Indicators for Adults by Rural/Urban Status, Missouri, 2011



*CBE: Clinical breast exam.

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

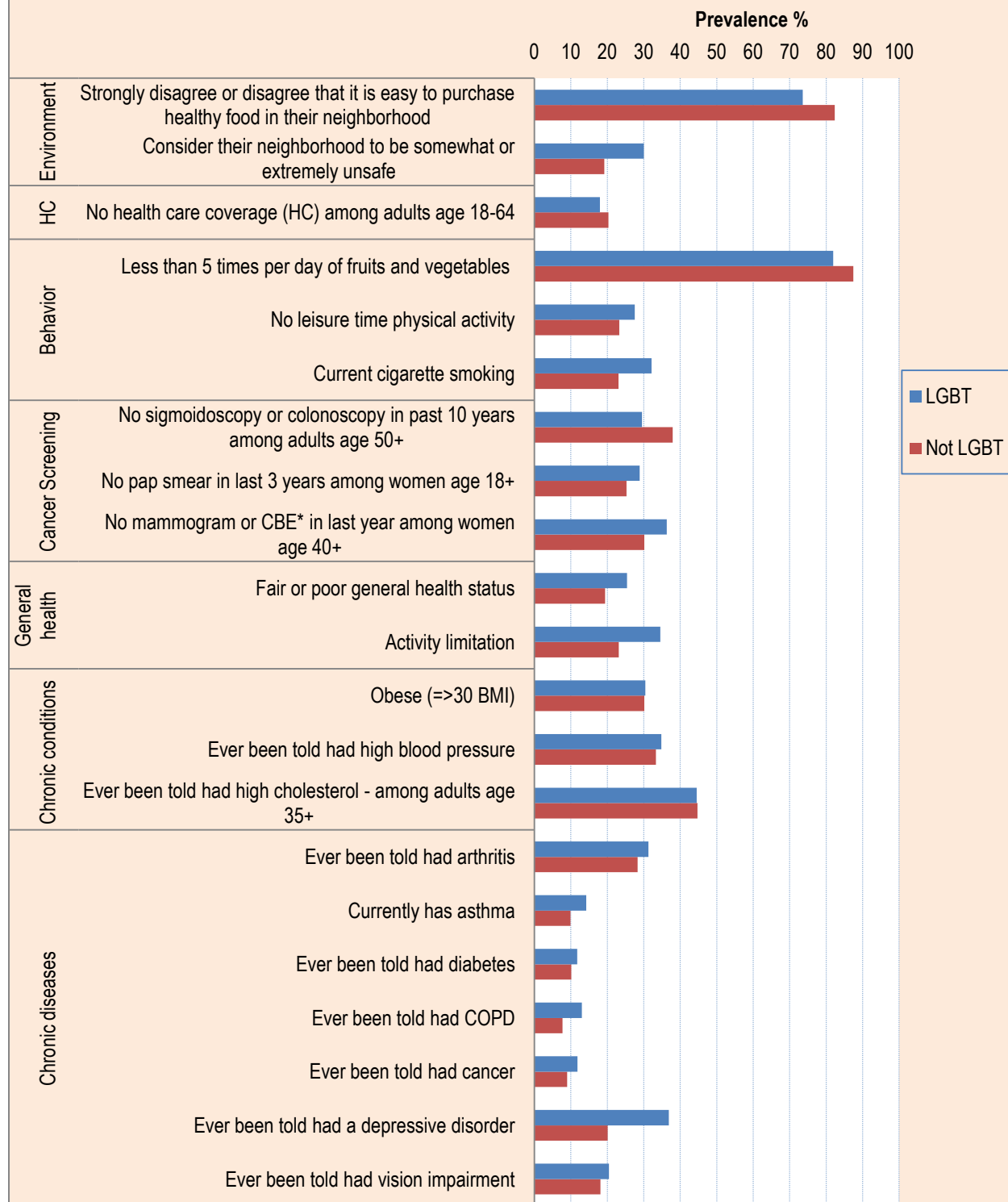
Figure 111. Urban and Rural Areas by Zip Codes, Missouri, 2011



Sexual Orientation

Lesbian, gay, bisexual, and transgender (LGBT) individuals are becoming more visible in society and more socially acknowledged. Based on the self-reported data in the 2011 Missouri County-level Study, 0.8 percent of Missouri women were lesbian, 1.6 percent of men were gay, 0.7 percent of men and 1.1 percent of women were bisexual, and 0.1 percent were transgender individuals. Studies have found some significant health disparities between heterosexual adults and LGBT adults. In Missouri, LGBT individuals were more likely to smoke (32.1% vs. 23.1%), have a depressive disorder (36.9% vs. 20.1%), consider their neighborhood to be somewhat or extremely unsafe (30.0% vs. 19.2%), have activity limitations (34.5% vs. 23.1%) compared to non-LGBT individuals. However, a higher percentage of LGBT individuals agreed or strongly agreed that it is easy to purchase healthy food in their neighborhood (73.6% vs. 82.4%) (Figure 112).

Figure 112. Chronic Disease Health Indicators for Adults by LGBT Status, Missouri, 2011



*CBE: Clinical breast exam.

Source: 2011 Missouri County-level Study, Missouri Department of Health and Senior Services and Missouri Foundation for Health

Part Six: Progress and Challenges

Chapter X: Progress in the Last Decade

Decreased Burden*

In the last decade, significant progress has been made in Missouri in the following chronic disease health indicators:

Mortality Rates

From 2000 to 2009, the following age-adjusted mortality rates have decreased significantly in Missouri:

- Heart disease mortality rate decreased by 30 percent from 288.3 per 100,000 population to 201.3 per 100,000 population
- All-cancer mortality rate decreased by 10.9 percent from 259.2 per 100,000 to 231.0 per 100,000 among men and decreased by 6.2 percent from 170.6 per 100,000 to 160.0 per 100,000 among women
 - Lung cancer mortality rate among men decreased by 10.1 percent from 88.2 per 100,000 to 79.3 per 100,000
 - Breast cancer mortality rate among women decreased by 10.8 percent from 27.8 per 100,000 to 24.8 per 100,000
 - Prostate cancer mortality rate among men decreased by 25.4 percent from 29.1 per 100,000 to 21.7 per 100,000
 - Colorectal cancer mortality rate decreased by 17.2 percent from 25.6 per 100,000 to 21.2 per 100,000 among men and decreased by 19.9 percent from 18.1 per 100,000 to 14.5 per 100,000 among women
- Cerebrovascular disease mortality rate decreased by 31.0 percent from 63.6 to 43.9 per 100,000
- Diabetes mortality rate decreased by 20.3 percent from 24.6 per 100,000 to 19.6 per 100,000

*Significant trend or changed significantly between the beginning and the end year

Hospitalization and Emergency Room Visit Rates

From 2000 to 2009 the following age-adjusted hospitalization and emergency room visit rates have decreased significantly in Missouri:

- Heart disease hospitalization rate decreased by 18.7 percent from 168.3 per 10,000 population to 136.8 per 10,000 population
- Cerebrovascular disease hospitalization rate decreased by 19.0 percent from 35.7 per 10,000 to 28.9 per 10,000
- Asthma emergency room visit rate decreased by 5.6 percent from 5.4 per 1,000 in 2000 to 5.1 per 1,000 in 2009

Cancer Incidence Rates

From 2000 to 2008, the following age-adjusted cancer incidence rates have decreased significantly in Missouri:

- All-cancer incidence rate decreased by 7.8 percent from 544.2 per 100,000 population to 502.0 per 100,000 population among men and decreased by 2.0 percent from 420.6 per 100,000 to 412.0 per 100,000 among women
 - Lung cancer incidence rate among men decreased by 11.5 percent from 103.7 per 100,000 to 91.8 per 100,000
 - Colorectal cancer incidence rate decreased by 22.1 percent from 68.7 per 100,000 to 53.5 per 100,000 among white men, by 22.8 percent from 52.2 per 100,000 to 40.3 per 100,000 among white women, and by 17.6 percent from 67.2 per 100,000 to 55.4 per 100,000 among African-American women
 - Cervical cancer incidence rate decreased by 28.3 percent from 9.9 per 100,000 to 7.1 per 100,000

Prevalence of Chronic Diseases and Conditions

There has been little to no progress during the last decade in reducing the prevalence of chronic diseases and conditions. In fact, the prevalence has increased for most chronic diseases and conditions. However, a progress has been made in the reduction of major risk factors.

Prevalence of Risk Factors

From 2000-2010

- The prevalence of smoking among adults has decreased by 22.1 percent from 27.2 percent to 21.1 percent
- The prevalence of not meeting CDC physical activity recommendation among adults has decreased by 17.2 percent from 60.4 percent to 50.0 percent
- The prevalence of heavy drinking among African-American men has decreased by 90.8 percent from 10.9 percent to 1.0 percent

From 2001 to 2009

- The prevalence of smoking among high school students has decreased by 37.6 percent from 30.3 percent to 18.9 percent

From 2003 to 2011

- The prevalence of smoking among middle school students has decreased by 38.6 percent from 8.8 percent to 5.4 percent

Improvement on Cancer Screening and Chronic Disease Care and Self-management

From 2001 to 2010

- The prevalence of ever having had a sigmoidoscopy or colonoscopy among adults age 50 years or older has increased by 51.6 percent from 43.0 percent to 65.2 percent
- The percentage of adults with diabetes who have ever attended a diabetes self-management class increased by 33.0 percent from 43.6 percent to 58.0 percent
- The percentage of African-American men with diabetes who had a flu shot in the last year increased by 453.0 percent from 10.9 percent to 60.3 percent
- The percentage of African-American men with diabetes who had ever had a pneumococcal vaccination increased by 273.1 percent from 16.7 percent to 62.3 percent

Reduced Disparities

From 2000 to 2009, racial disparity has declined in the following indicators:

- Age-adjusted diabetes mortality rates
- Age-adjusted all-cancer mortality rates
- Age-adjusted lung cancer mortality rates among men
- Age-adjusted breast cancer mortality rates among women
- Age-adjusted lung cancer incidence rates among men
- Age-adjusted cervical cancer incidence among women

Chapter XI: Challenges

Missouri faces tremendous challenges in chronic disease prevention and control. The burden of chronic diseases in Missouri is likely to grow as the population ages and also because of the increasing prevalence of obesity and associated chronic conditions. In addition, there are substantial racial/ethnic and socioeconomic disparities in Missouri - minorities and people of lower socioeconomic status are disproportionately affected by chronic diseases. Furthermore, funding for chronic disease prevention and control is limited.

Aging Population

The rapid aging of the population is among the major public health challenges faced in chronic disease prevention and control. Older adults are disproportionately affected by chronic diseases, which are associated with disability, diminished quality of life, and increased costs for health care and long-term care. In Missouri in 2011, about 95 percent of seniors had at least one of the 13 aforementioned chronic diseases or conditions, more than 80 percent had at least two, and about 65 percent had at least three of these chronic diseases and conditions.

The proportion of seniors in Missouri's population was 13.5 percent in 2000 and increased to 14.0 percent in 2010. The first baby boomers turned 65 in 2011, beginning a period with even faster pace of growth in the senior population. By 2030, Missouri's senior population will increase to 21.0 percent.¹⁸ The proportion of the senior population in Missouri has been and will be continuously higher than that in the nation overall.

High and Increasing Burden

Compared to the US overall, Missouri has a higher burden of *almost all* chronic diseases, conditions, and risk factors. Missouri's prevalence of smoking, physical inactivity, inadequate fruit and vegetable consumption, obesity, hypertension, high cholesterol and diabetes are all higher than that in the US. Furthermore, the prevalence of obesity, hypertension and diabetes are increasing significantly over time in Missouri, and at a faster pace than that in the US. Without a strong chronic disease prevention and control effort, this high prevalence of risk factors and chronic conditions will likely lead to more emergency room visits, hospitalizations, and deaths. Additionally, there will be more disabilities, decreased quality of life, increased medical care spending, and lost productivity.

¹⁸ Office of Administration. Population Projections. Available from: <http://content.oa.mo.gov/budget-planning/demographic-information/population-projections>

Racial/ethnic and Socioeconomic Disparities

There are *substantial*, and in certain cases, *increasing* disparities in chronic diseases morbidity and mortality in Missouri. Minorities and people of lower socioeconomic status have a higher burden of *most* chronic diseases, conditions, and risk factors. Currently a relatively limited numbers of evidence-based interventions have been identified to address these social determinants of health. However, economic development, political will, and well-coordinated efforts from multiple sectors are crucial elements for reducing health disparities and improving overall population health. Unfortunately, these elements are hard to attain and many are out of the control of public health professionals.

Funding

Adequate funding is needed to effectively address the challenges of reducing the burden of chronic diseases among Missouri adults. Currently the majority of funding for chronic disease prevention and health promotion programs in the Department of Health and Senior Services is from federal sources. These sources are disseminated categorically; that is, for specific chronic diseases, conditions or risk factors. This presents challenges for implementing a planned, comprehensive approach for the prevention of chronic diseases. Efforts to better coordinate the funding of programs at the federal level are underway that will enable states to better coordinate chronic diseases prevention and control activities.

States, too, must do their part in dedicating funding for prevention of chronic diseases. Evidence has shown that chronic disease prevention is cost effective.¹⁹ Investing in chronic disease prevention is not only the economically smart thing to do, it is the right thing to do.

¹⁹ Trust for America's Health. Prevention for a healthier America: investments in disease prevention yield significant savings, stronger communities. Available from: www.healthymamericans.org/reports/prevention08.

Major Data Sources:

- American Cancer Society. Cancer Facts & Figures. Available from:
<http://www.cancer.org/research/cancerfactsstatistics/index>.
- Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. Available from: <http://apps.nccd.cdc.gov/brfss/>.
- Centers for Disease Control and Prevention. CDC WONDER. Online Data for Epidemiologic Research. Available from: <http://wonder.cdc.gov/>.
- Centers for Disease Control and Prevention. Youth Risk Behavior Survey. Available from: <http://www.cdc.gov/HealthyYouth/yrbs/>.
- The Henry J. Kaiser Family Foundation, State Health Facts: Poverty Rate by Race/Ethnicity. Available from: <http://kff.org/other/state-indicator/poverty-rate-by-raceethnicity/#>.
- Missouri Department of Health and Senior Services. 2011 Missouri County-level Study. Available from:
http://health.mo.gov/data/mica/County_Level_Study_12/header.php?cnty=929&profile_type=1&chkBox=C.
- Missouri Department of Health and Senior Services. Missouri Information for Community Assessment. Available from: <http://health.mo.gov/data/mica/MICA/>.
- Missouri Department of Health and Senior Services and CDC. Missouri Youth Tobacco Survey. Available from: http://www.cdc.gov/tobacco/data_statistics/surveys/yts/.
- National Center for Health Statistics. Health, United States, 2011: With Special Feature on Socioeconomic Status and Health. Available from:
<http://www.cdc.gov/nchs/data/hus/hus11.pdf#listfigures>.
- Office of Administration. Population Projections. Available from:
<http://content.oa.mo.gov/budget-planning/demographic-information/population-projections>.
- Rural Health Research Center. RUCA. Available from:
<http://depts.washington.edu/uwruca/ruca-data.php>.
- Trust for America's Health. Prevention for a Healthier America. Available from:
www.healthyamericans.org/reports/prevention08.

- United Nations. Sixty-sixth General Assembly Plenary. Available from:
<http://www.un.org/News/Press/docs/2011/ga11138.doc.htm>.
- United States Census Bureau. Educational Attainment. Available from:
<http://www.census.gov/hhes/socdemo/education/index.html>.
- United State Census Bureau. Population Projections. Available from:
<http://www.census.gov/population/projections/>.
- United State Census Bureau. Race. Available from:
<http://www.census.gov/population/race/data/>.
- World Health Organization. Social Determinants of Health. Available from:
http://www.who.int/social_determinants/en/.

Glossary:

Age-adjusted Rate: A rate, such as incidence or mortality, adjusted to the age distribution of a specified standard population, to permit comparison among populations having different age distributions. Rates are usually age-adjusted to the 2000 U.S. Standard Population

Prevalence: The number of existing cases in a defined population in a given time period, usually a year:

$$(Number\ of\ existing\ cases \div population\ in\ the\ year) \times 100$$

Incidence rate: Number of new cases of a disease during a specified time period in a population at risk for developing the disease:

$$(Number\ of\ new\ cases\ of\ disease\ in\ the\ year \div population\ at\ midyear) \times 100,000$$

Mortality rate: Number of deaths in a specified population over a specified time period in a specified geographic area:

$$(Number\ of\ deaths\ in\ the\ year \div population\ at\ midyear) \times 100,000$$

Confidence Interval (CI): A range of values, calculated from the sample observations that include the true value. For a rate, the 95% CI will include the true rate 95% of the time, if the samples and calculations are repeated many times.

Significant: A result is considered statistically significant if it is unlikely to have occurred by chance alone, at or above the probability level specified by the p-value or confidence interval (CI). The most commonly selected level is 95% (or $p = .05$) and is the level used throughout this report, unless otherwise stated. That is, where p-values are shown, significance was determined at $p \leq .05$, or for CI's, when the 95% confidence intervals for paired estimates did not overlap (Note that CI's may overlap and still be significantly different. The standard used here is therefore a conservative determination).

Trend: Linear trend analyses were conducted for prevalence data and log-linear trend analyses were conducted for incidence and mortality rates and other rate data.



Missouri Department of Health and Senior Services

RELAY MISSOURI for Hearing and Speech Impaired 1-800-735-2966 VOICE 1-800-735-2466

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

Services provided on a nondiscriminatory basis.